CANON E-100/110E

MODEL

SERVICE MANUAL

SERVICE MANUAL

(REF. NO. D15-5830)

8mm Video Camcorder

PAL

DY8-1155-830-000

(REF. NO. D15-4730,4731)

8mm Video Camcorder

PAL

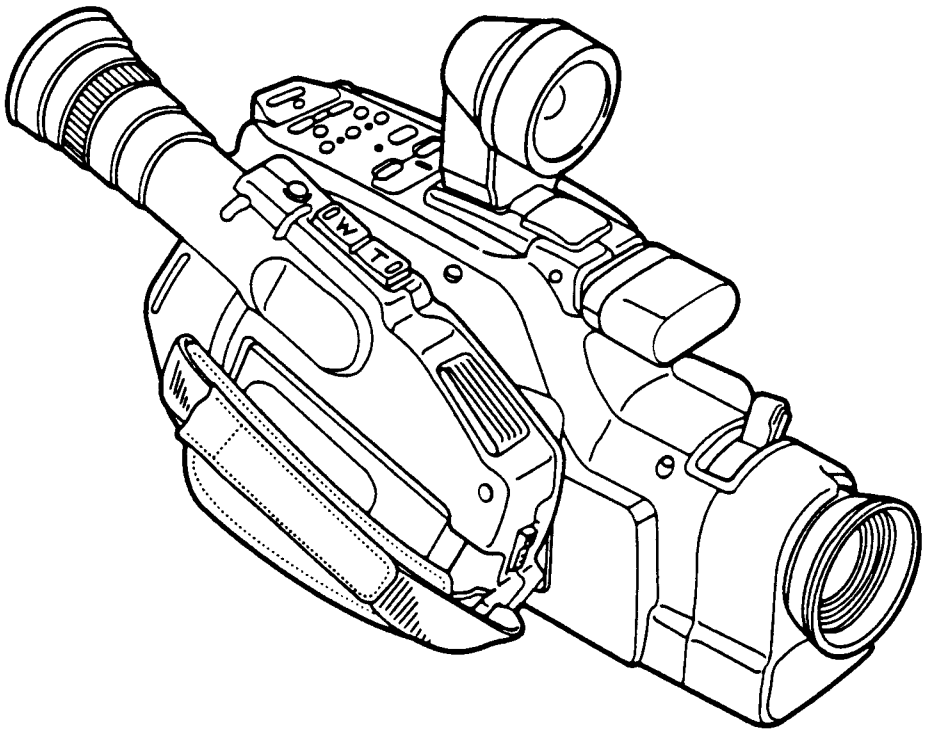
F-PAL

DY8-1154-730-000

(REF. NO. D15-5830)

8mm Video Camcorder

PAL



DY8-1155-830-000

Canon Inc.
Video Technical Service Dept.
First Edition: Jun. 1991
Printed in Japan

SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine CANON replacement parts.
   Especially critcal parts in the power circuit block should not be replaced with other makes.
   Critical parts are marked with ⚠ in the schematic diagrams.
2. The primary source of X-ray radiation in this viewfinder is the picture tube. The tube used in the viewfinder is especially constructed to limit X-ray radiation emission. For continued X-ray radiation protection, the replacement tube must be same type as the original, CANON approved one.
3. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been oberheated or damaged by the short circuit.
4. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
5. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

5-1 Leakage Current Cold Check

1) Unplug the AC cord and connect a jumper between the two prongs on the plug.
2) Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metalic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metalic part has a return path to the chassis, the reading should be between 1MΩ and 5.2MΩ. When the exposed metal does not have a return path to the chassis, the reading must be ∞.

5-2 Leakage Current Hot Check

1) Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2) Connect a 1.5KΩ 10 watt resistor, paralleled by 0.15μF capacitor, between each exposed metalic parts on the unit and a good earth ground such as a water pipe, as shown in the figure below.
3) Use an AC voltmeter, with 1000Ω/volt or more sensitivity, to measure the potential across the resistor.
4) Check all exposed metallic parts of the cover (Cable connection, Handle bracket, metallic cabinet. Screwheads, Metallic overlays, etc), and measure the voltage at each point.
5) Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6) The potential at any point should not exceed 0.75V RMS.
   A leakage current tester (FLUKE MODEL: 8000A equivalent) may be used to make the hot checks.
   Leakage current must not exceed 0.5 milliamp.
   In case a measurement is out side of the limits specified, there is a possibility of a shock hazard, and corrective action must be taken before returning the instrument to the customer.

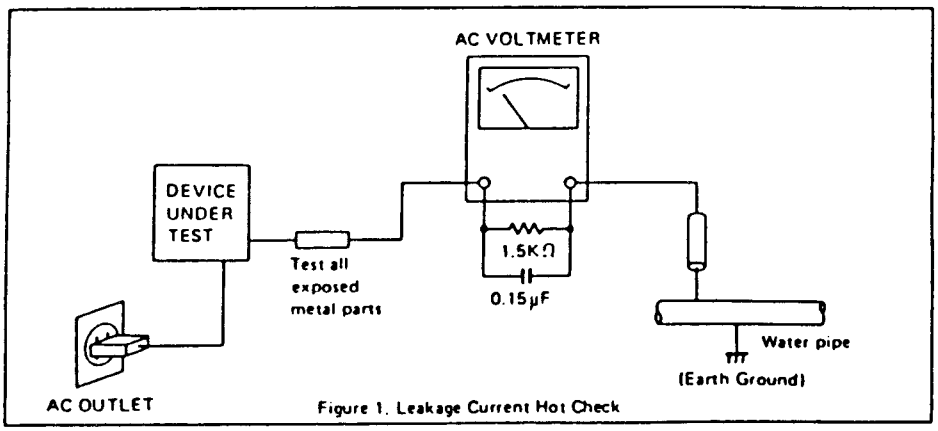


Figure 1. Leakage Current Hot Check

CONTENTS

CHAPTER I. GENERAL DESCRIPTION OF PRODUCT

CONTENTS

CHAPTER I. GENERAL DESCRIPTION OF PRODUCT

1. Outline of Product

The product E60E,F have been developed as models substituting E50E,F series. While retaining the simple operation, stable shooting and high quality picture of E50E,F series, the shooting area is extended (sensitivity increase function added, non-cord video light adopted) and work creating functions are substantiated (character title scroll, title and date mixture at playback).

1-1 Features

(1) High quality picture

- ° Newly developed high-resolution zoom lens installed (8x)
- ° High sensitivity and high performance, 1/3 inch 320,000 pixel CCD (image pickup device) installed
- ° 25 division evaluation AWB
- ° Near infrared dual beam AF (0.6 m ∿)
- ° Center-oriented average light measurement + auto BLC + auto knee

(2) Multiple functions

- ° Sensitivity increasing function provided permits to shoot a dark object of approximately 2 lux.
- ° Non-cord battery video light VL-7 standard provided
- ° High speed search (SP: 15x speed LP: 30x speed)
- ° Character title that can be scrolled
- ° Auto date function

(3) Operability

- ° EVF incorporating rotary grip
- ° Wireless remote controller standard provided
- ° Sports finder SF-200 standard provided
- ° Linear time counter

1-2 Features of different sections

Table I-1 gives features of different sections of the product.

Table I-1

Lens		Camera		Recorder		
Lens	AF	CCD	SENSOR, PROCESS	AUDIO-VIDEO	SYSCON-SERVO	Recorder mechanism
8x New.	Near infrared dual beam. AF. New.	1/3 inch. 320,000 pixels. New.	New IC. E50 type circuit.	E50 type.	SYSCON: new SERVO : H800 type	MC-4C

1-3 Features of 60E,F

Table I-2 Specification list

Body color	Black
Dimensions W x H x D including hood (H + 50 mm when attaching video light VL-7)	110 x 125 x 302 mm
Weight of main unit	Approx. 950 g
Lens zoom ratio, focal distance (converted to that of 1/2 inch lens)	8x, 7.0 ∿ 56 mm (Approx. 9.2 ∿ 73 mm)
Minimum luminosity	2 lux at increased sensitivity
High speed electronic shutter	1/1000 sec, 1/60 sec
Finder	Sports finder SF-200
Line recording	Impossible
Sound	Monaural
Video light VL-7	Adopted
Character title scroll	Possible
Wireless controller	Possible

1-4 Brief description of control buttons, terminals and external parts

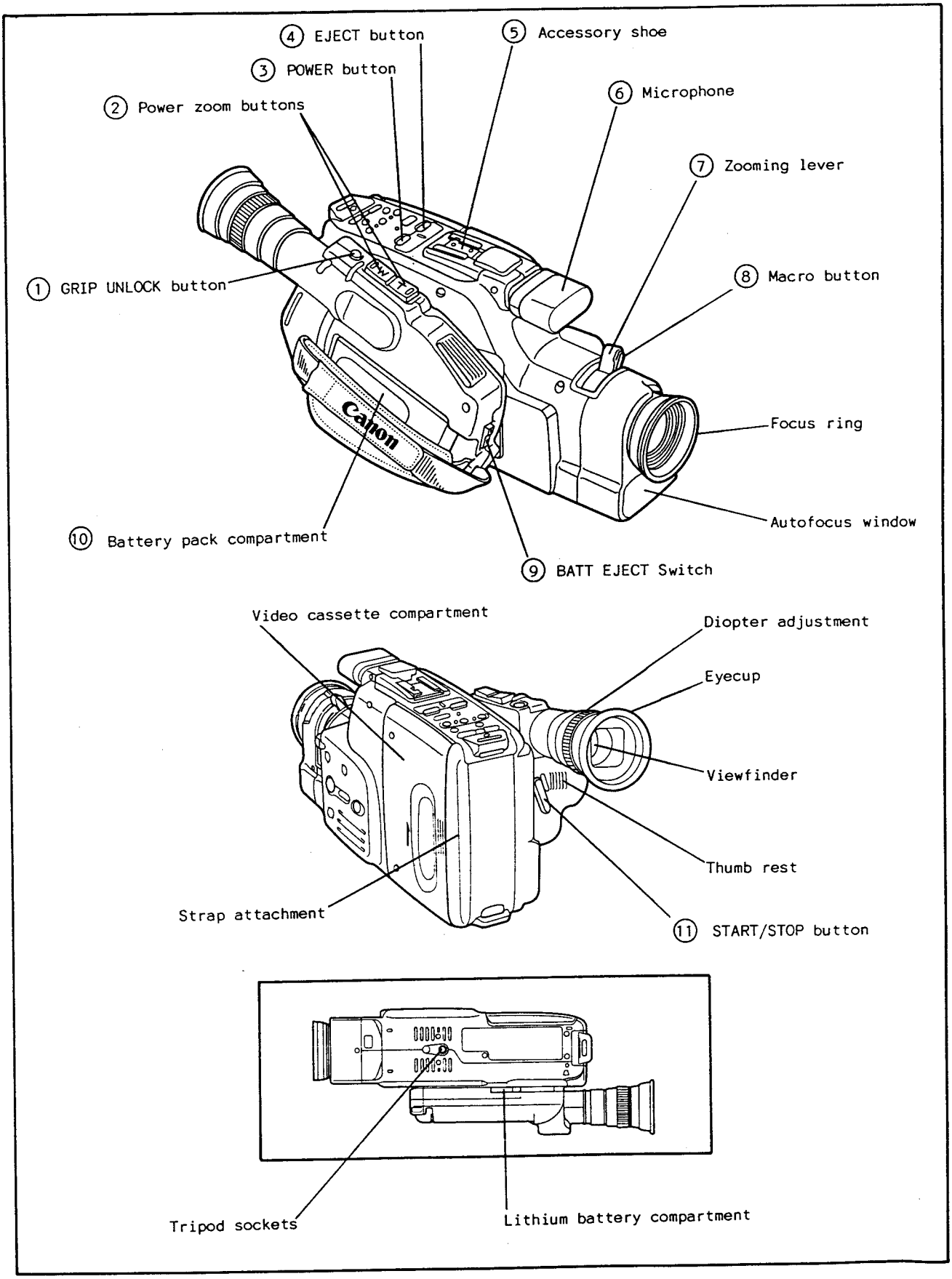


Fig. I-1

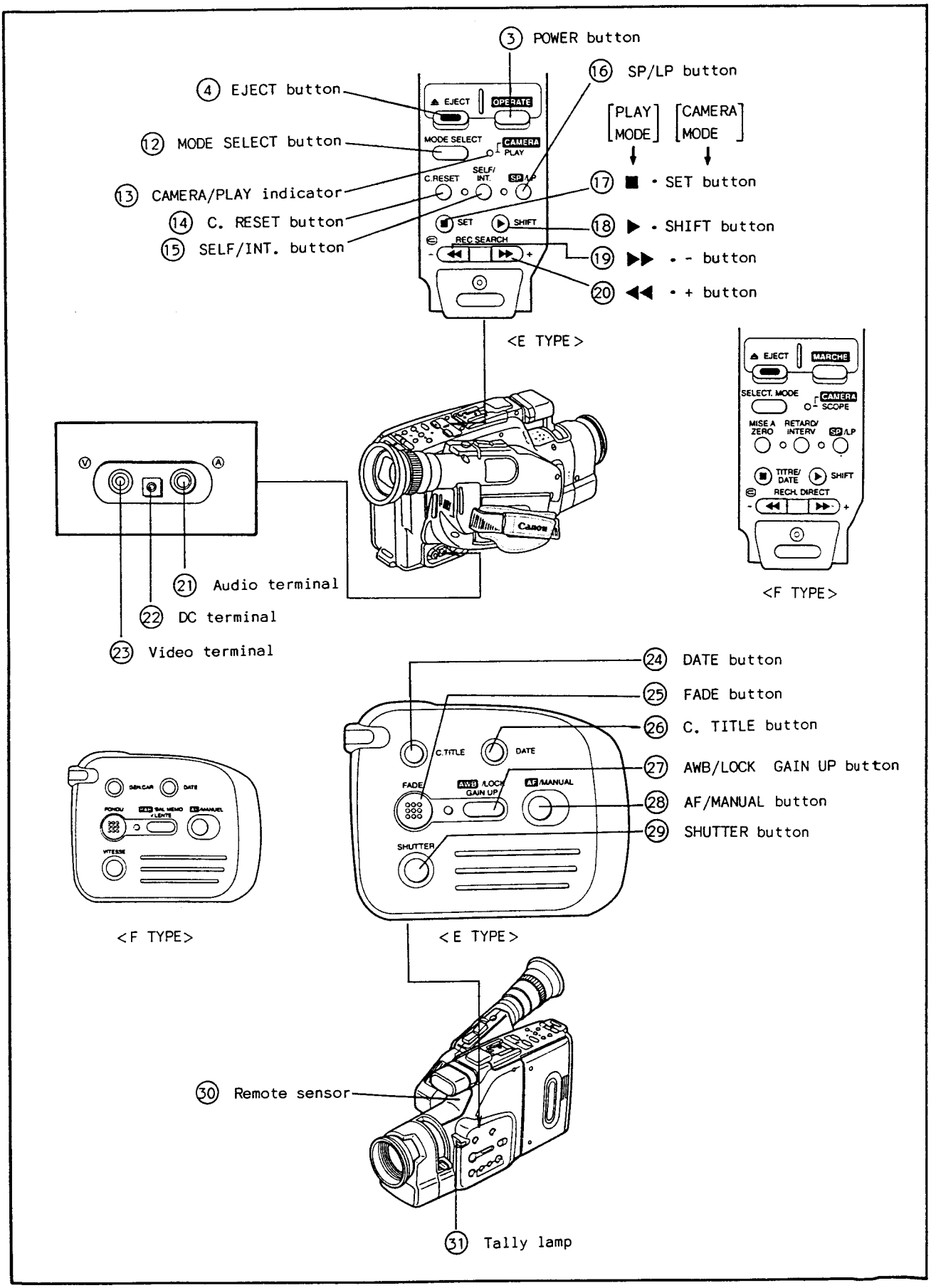

③ POWER button
④ EJECT button
⑫ MODE SELECT button
⑬ CAMERA/PLAY indicator
⑭ C. RESET button
⑮ SELF/INT. button
⑯ SP/LP button
[PLAY MODE]
[CAMERA MODE]
⑰ ■ • SET button
⑱ ▶ • SHIFT button
⑲ ▶▶ • - button
⑳ ◀◀ • + button
<E TYPE>
<F TYPE>
㉑ Audio terminal
㉒ DC terminal
㉓ Video terminal
㉔ DATE button
㉕ FADE button
㉖ C. TITLE button
㉗ AWB/LOCK GAIN UP button
㉘ AF/MANUAL button
㉙ SHUTTER button
<F TYPE>
<E TYPE>
㉚ Remote sensor
㉛ Tally lamp

Fig. I-2

1-4 Brief description of control buttons, terminals and external parts

① GRIP UNLOCK button
Keep the button pressed, rotate the grip until an easy shooting position is obtained and release the button to lock.

② Power zoom buttons (W/T)
The frame (field angle) is continuously changeable from Wide to Telephoto.

③ POWER button
Turns on or off power.

④ EJECT button
Pressing other than when recording allows you to take out the cassette tape regardless of whether power is turned on or not.

⑤ Accessory shoe
Video light VL-7 and other accessories are mounted. The video light can be lit when recording.

⑥ Microphone
Unidirectional monaural mic (stationary)

⑦ Zooming lever
Changes the frame (field angle). In the macro area, the lever sets the focus.

⑧ Macro button
At a close-up, press this button and bring the lever to the macro area.

⑨ BATT EJECT switch
Slide the switch upward and take out the power supply from the battery box.

⑩ Battery pack compartment
Under its middle, there is a switch for detecting battery/car adapter. When using a battery, the video light can be lit.

⑪ START/STOP button
Pressing it at a recording pause status starts recording and pressing it again suspends recording. In the self/interval timer mode, start/intermediate cancel is available.

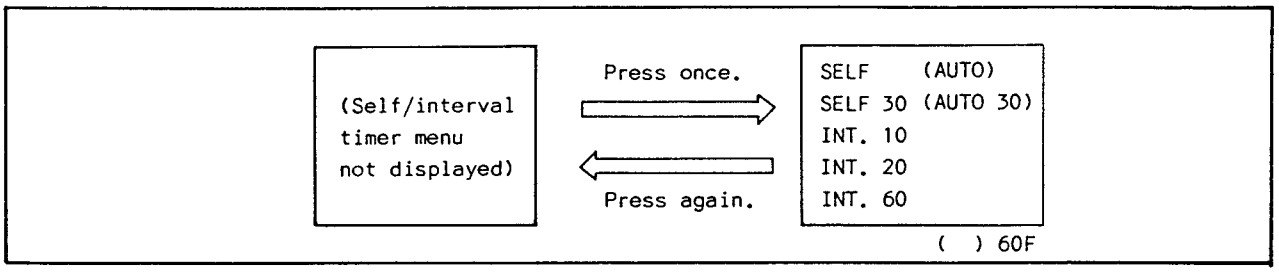
⑫ MODE SELECT button
Every pressing alternately selects PLAY MODE or CAMERA MODE.

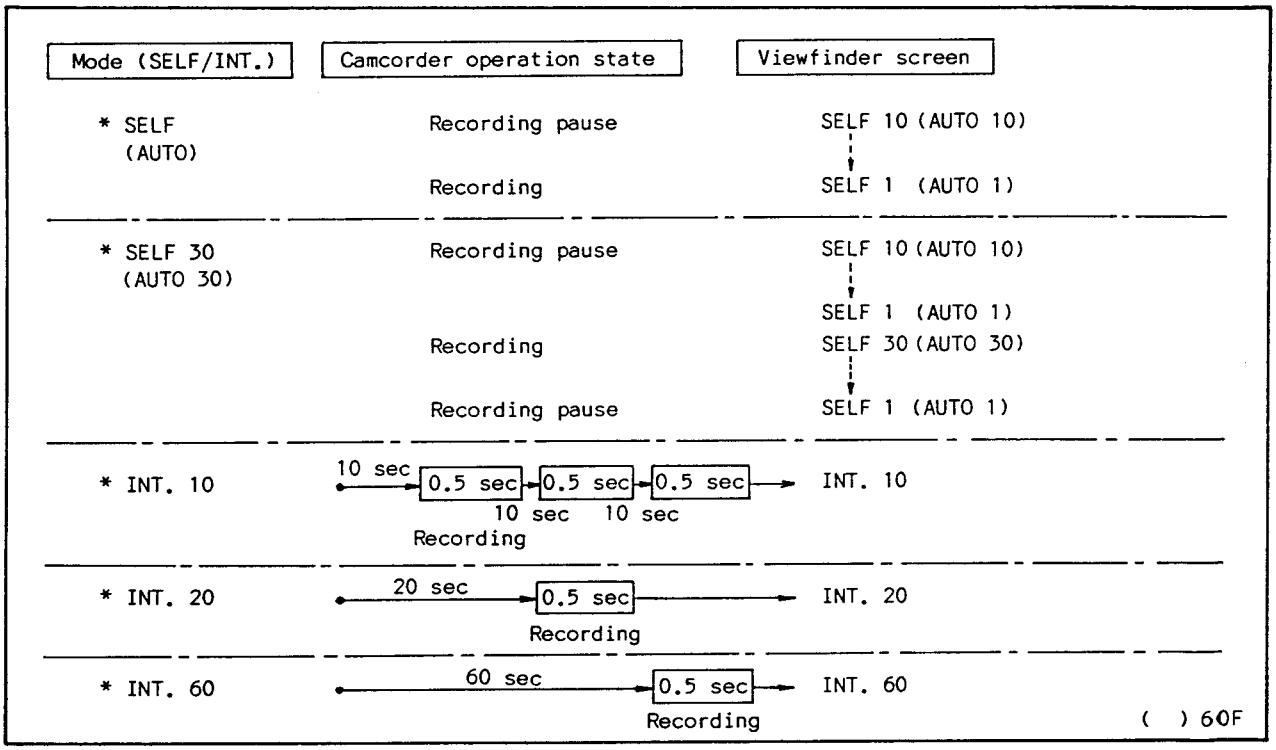
⑬ CAMERA/PLAY indicator
Lights red in the CAMERA MODE or green in the PLAY MODE to indicate the mode.
Blinks to warn of under-voltage, condensation or error, if any.

⑭ C. RESET button
Pressing the button resets the linear tape counter to 0:00:00. For your information, putting in a cassette resets the counter.

⑮ SELF/INT. button

The self/interval timer menu is displayed on the viewfinder screen by pressing this button. When it is pressed again, the self/interval timer menu disappears from the viewfinder screen.





⑯ SP/LP button

Pressing this button changes the tape speed. (SP/LP)

⑰ ■ · SET button

CAMERA MODE: SET button

When this button is pressed once, the title setting mode is selected. In this mode, any desired title can be set with the PLUS/MINUS button. When the CHARACTER TITLE/DATE SETTING button is pressed again, the blinking of title is ceased and the title is stored into memory. When the CHARACTER TITLE/DATE SETTING button is held down for approx. three seconds, the date/time setting mode is selected. In this mode, the user can set 'year, month, day' or 'hours, minutes'.

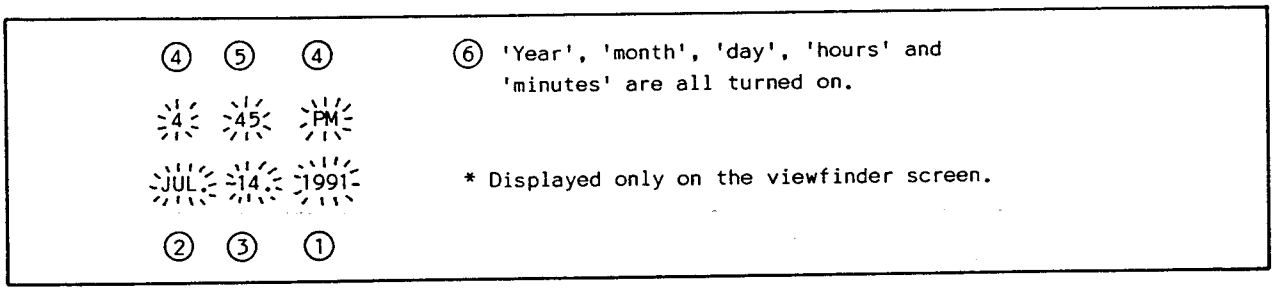
PLAY MODE : ■.stop button

Pressing this button causes tape drive to stop.

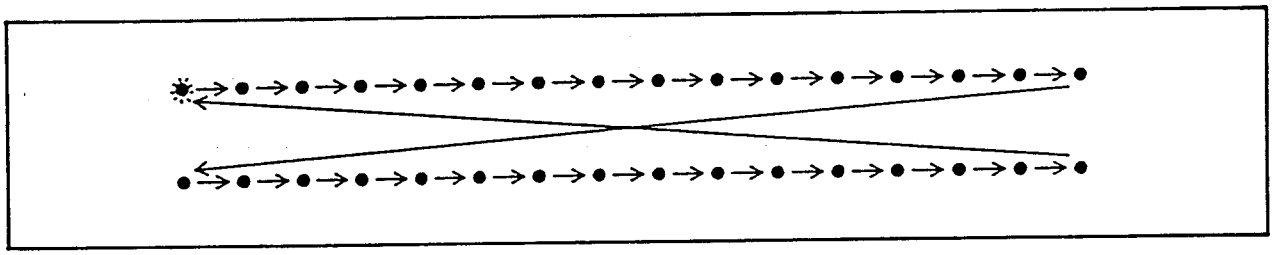
⑱ ▶ ·SHIFT button

CAMERA MODE: SHIFT button

° In the auto date setting, 'year', 'month', 'day', 'hours' and 'minutes' can be selected by pressing this button.



° The title character position can be shifted using this button as indicated below. (16 characters x 2 lines)



PLAY MODE : ▶ Play button

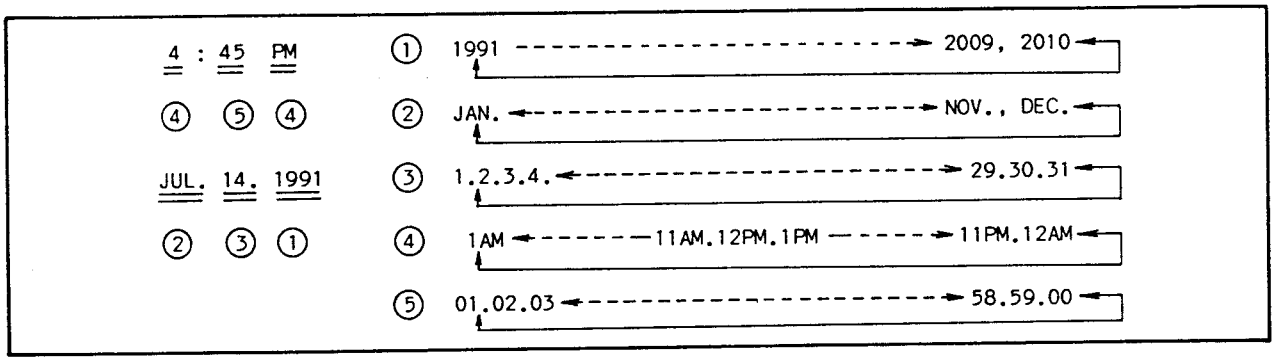
Pressing this button starts the playback operation.

⑲ ◀◀ • - button

CAMERA MODE: - button

- Pressing the button at a recording pause reversely displays the tape up to approximately 3 seconds from the currently stopped tape position, replays it back for 3 seconds, stops it at the initial position and resumes the recording pause status. (Recording check).
  Holding it down plays back the tape continuously until it is released. (Head search).
- If functions as a character select button when auto date is set. (-).

DATE



PLAY MODE : ◀◀ Rewind button

Pressing it at a stoppage rewinds the tape or, holding it down while playing back plays back the tape reversely at 7x speed. Releasing it resumes a normal playback status.
Pressing it while rewinding plays back the tape reversely at 20x speed and pressing it again resumes normal rewinding. Holding it down while rewinding rewinds and plays back reversely at 20x speed.

⑳ ▶▶ • + button

CAMERA MODE: + button

- Holding it down at a recording pause searches a recorded picture in + direction and releasing it resumes the recording pause status.
- If functions as a character select button when auto date/title is set. (+).

PLAY MODE : ▶▶ Fast forward button

Pressing it at a stoppage feeds the tape rapidly or pressing it while playing back plays back the tape rapidly at 9x speed. Releasing it resumes anormal playback status.
Pressing it while forward plays back the tape reversely at 20x speed and pressing it again resumes normal forward.
Holding it down while fast forward plays back fast at 20x speed.

㉑ Audio terminal

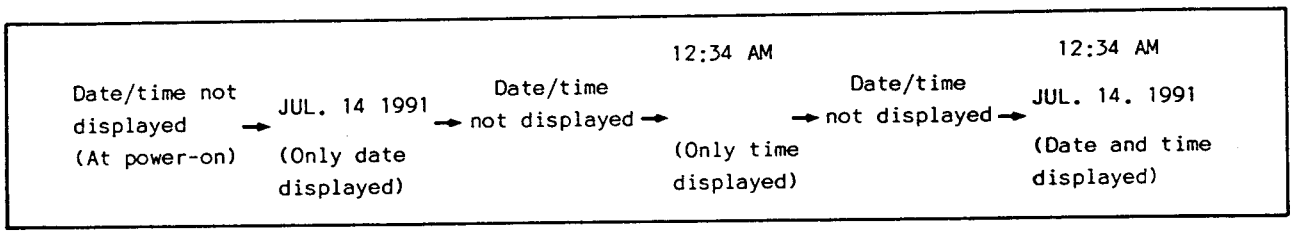
Auto input/output terminal.

㉒ DC terminal

Power (+5 V) output terminal for RF unit RU-E3.

㉓ Video terminal
Video input/output terminal

㉔ DATE button
Pressing this button displays the date and/or time on the viewfinder screen. In the CAMERA MODE, the date/time can be superimposed on the scene.



㉕ FADE button
In the CAMERA MODE, holding down this button causes the picture and sound to disappear gradually (fade out). When it is released, they appear gradually (fade in). White fading is performed for approx. four seconds. Note that this white-fading function is not interlinked with the trigger button.

㉖ C. TITLE button
Pressing it indicates on the display or records a prearranged character title. Pressing it again extinguishes the indication. (Indication is available in any mode other than recording search.)

° Character title scroll procedure:
Operate the SET button ⑰ to select the character title setting mode. Pressing the C. TITLE button ㉖ develops "← SHIFT" under the character title in EVF and pressing it again develops "← SHIFT ←," on the display.
← SHIFT ..... in this mode, the character title appears from the right and stops at the center.
← SHIFT ← ... in this mode, the character title appears from the right, stops at the center for approximately 4 seconds and extinguishes to the left.
Pressing the SET button ⑰ while either of the above is being indicated selects a standby status of scroll mode being indicated. (In the EVF, the character title disappears and the SHIFT indication remains.)
Pressing the C. TITLE button ㉖ at this status starts scrolling the character title.
* For your reference, once scrolled in the CAMERA MODE, the scroll mode is reset. Selecting the PLAY MODE after selecting a standby status of scroll mode resumes the standby status after scrolling.

㉗ AWB/LOCK - GAIN UP button
Every pressing the button alternately selects full auto white balance and white balance lock. At a white balance lock status, "WB LOCK" appears in the EVF.
Holding down the button for at least 3 seconds validates the gain-up function. At this time, "GAIN UP" appears in the EVF.

㉘ AF/MANUAL button
Every pressing alternately selects auto focus or manual focus. At a manual focus, "M. FOCUS" appears in the EVF.

㉙ SHUTTER button
Pressing the button successively changes the shutter speed followed by a normal status.

㉚ Remote sensor

Infrared-light signals from the remote controller are received through this window. The signal-receivable range is approx. 30 degrees on each of the left and right angular sides and approx. 15 degrees on each of the upper and lower angular sides (with respect to the face of remote sensor). The maximum remote-control distance is five meters.

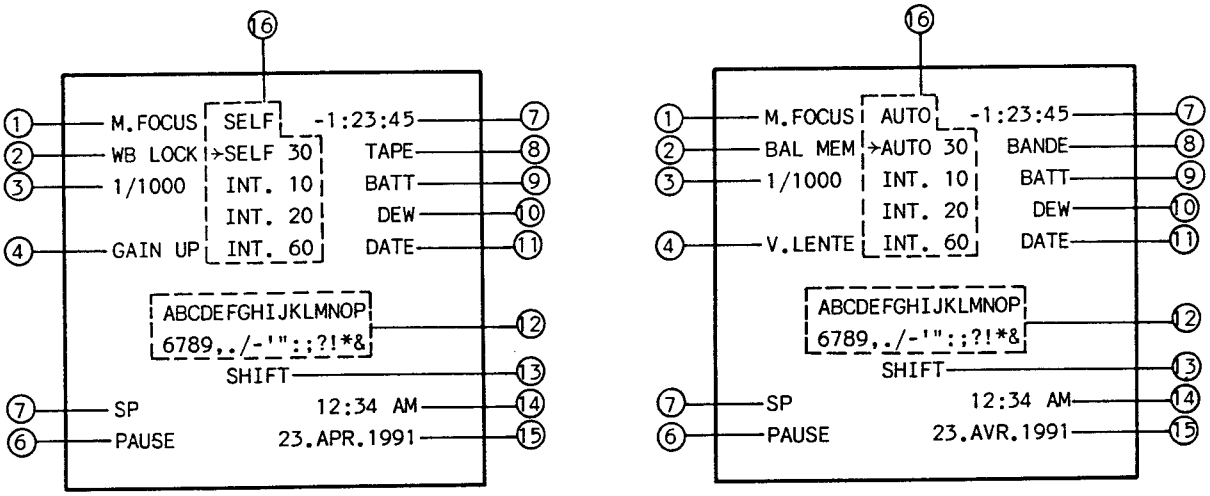
㉛ Tally lamp

The tally lamp flashes during the camera recording operation or the self/interval timer operation. It lights up steadily when the remote control signal is received.

Camera recording operation	Flashes at a cycle of 1 Hz.
Self-timer active state	Flashes at a cycle of 0.5 Hz.
Interval-timer active state	Flashes at a cycle of 0.5 Hz.
Remote control operation	Lights up steadily.

1-5 Information display on electronic viewfinder

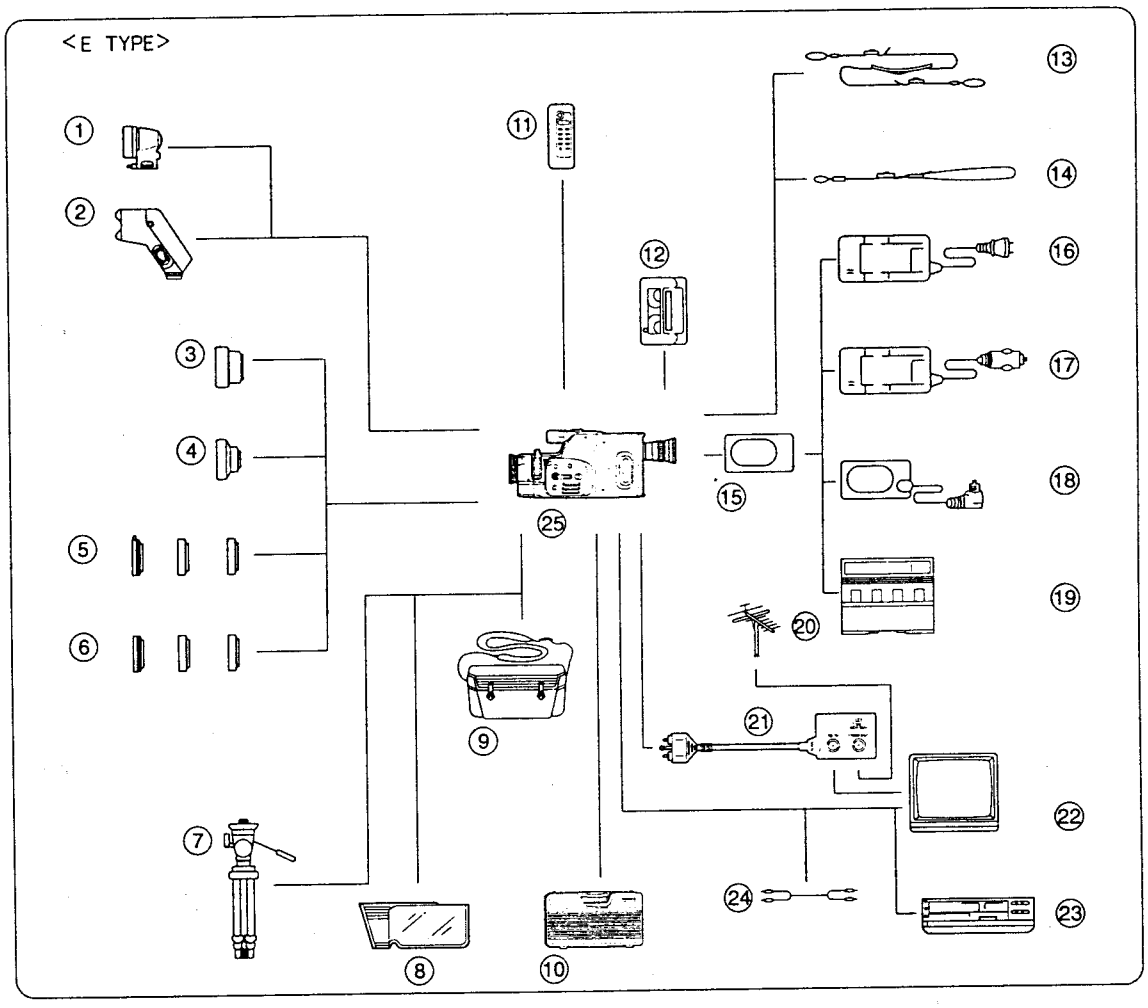
The electronic viewfinder in this camcorder lets the user readily know a repertoire of current statues and settings. It displays the camera operating status, recorder operating status, warning message, etc. Still more, the user can select the auto date/title display mode or the timer setting menu mode at a touch of the button.



No.	Mode	Display ( ) 60F	Description
①	Focus mode	No indication M. FOCUS	Auto focus mode Manual focus mode
②	White balance mode	No indication WB LOCK	Full auto white balance mode White balance lock mode
③	High speed shutter mode	No indication 1/1000	Normal shutter (1/60) Shutter speed 1/1000
④	Gain-up mode	GAIN UP (V.LENTE)	Indicated in gain-up mode.
⑤	Line input mode	SP/LP	Indicates the tape speed.
⑥	Operation indication	No indication PAUSE REC (ENR) PLAY (LECT.) STILL (ARRET) STOP FF (AVAN) REW (RET.) EJECT EJECT (blink)	No indication during recording search. Indicated at recording pause. Indicated during recording. Indicated during playback, fast forward playback or reverse playback. Indicated during still playback. Indicated at stop. Indicated at fast forward. Indicated during rewinding. Indicated when taking out video cassette. Indicated when protective function is actuated.
⑦	Count	-4:15:59 to 4:15:59	Indicates tape run time (hours, minutes, seconds). Reset to 0:00:00.

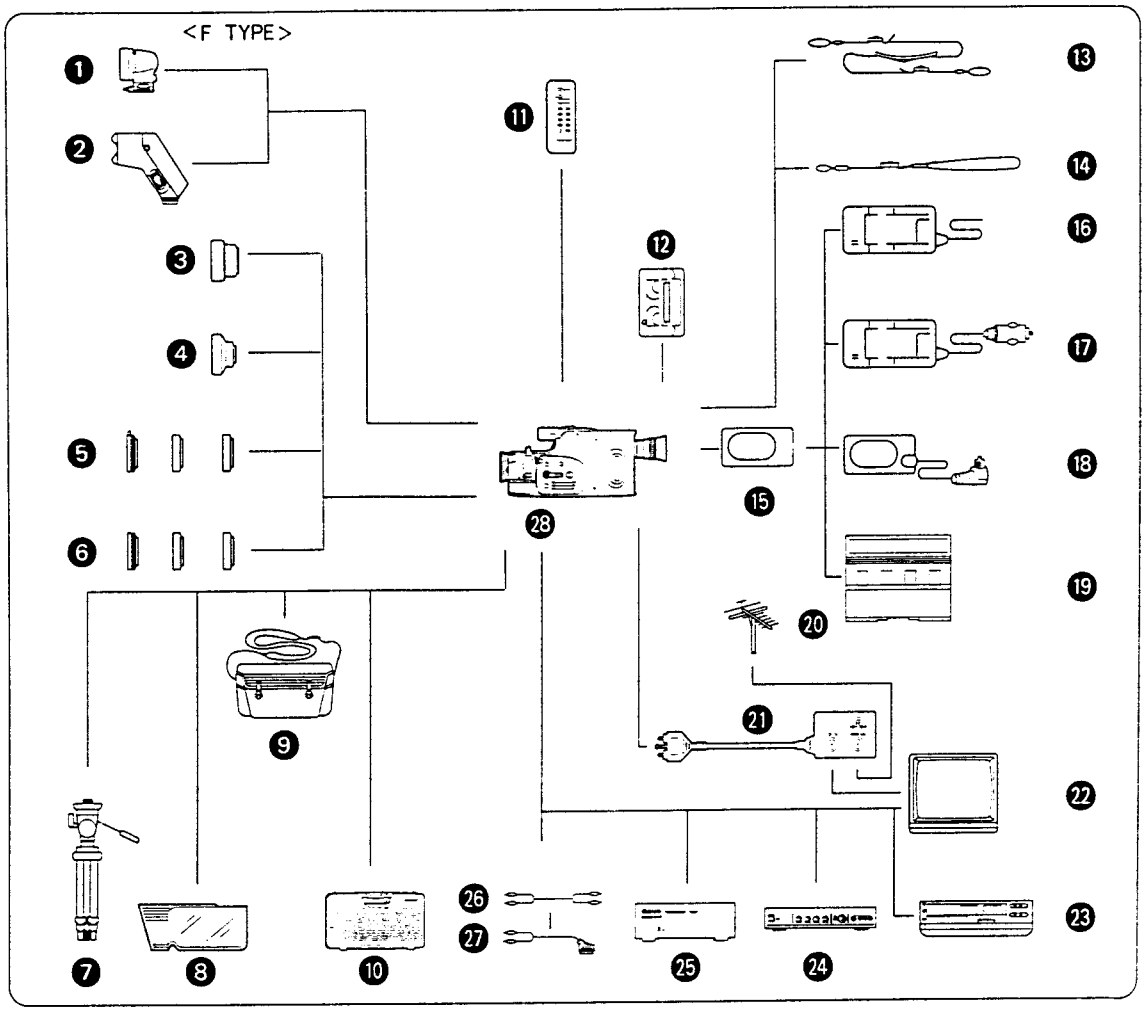
No.	Mode	Display	Description
⑧	Tape	TAPE (blink) (BANDE)(blink) T. END (BANDE)	Indicated when video cassette is not installed or when record protected tape in camera mode. Indicated when tape end is reached.
⑨	Battery	BATT (blink)	Indicated when battery pack voltage drops below certain level.
⑩	Condensation	DEW (blink) (COND)(blink)	Indicated if condensation occurs.
⑪	Lithium battery	DATE (blink)	Indicated if lithium battery voltage drops below certain level.
⑫	Title indication	16 columns x 2 lines	Title is indicated in A-Z, 0-9 and symbols.
⑬	Title indication mode	← SHIFT ← SHIFT←	Scrolls and stops character title at middle and, in approximately 4 seconds, extinguishes it. Scrolls and stops character title at middle, scrolls again and extinguishes it.
⑭	Time indication	12:59AM to 12:59PM	Indicates current time.
⑮	Date indication	18. APR. 1991 (18. AVR. 1991)	Indicates current date in A.D.
⑯	Timer recording selection mode	→ SELF (AUTO) SELF 30 (AUTO 30) INT. 10 INT. 20 INT. 60	Indicated at self timer recording or interval recording. → denotes selection cursor.
	Timer indication	0SEC to 10SEC 10SEC to 1SEC 30SEC to 1SEC INT. 10 INT. 20 INT. 60	Indicated for 10 seconds after starting shooting to notify shooting time. Indicated during self timer standby. Indicated during self timer 30 second recording. Indicated during interval timer 10 second execution. Indicated during interval timer 20 second execution. Indicated during interval timer 60 second execution.

1-6 E60E, F video system chart



① VL-7 Battery Video Light
② VL-20 Battery Video Light
③ WD-37 Wide Converter
④ TL-37 Tele-converter
⑤ FS-37 Filter Set
⑥ FS-37U Filter Set
⑦ Tripod
⑧ RS-60 Rain Shield
⑨ SC-800 Soft Carrying Case
⑩ HC-60 System Case
⑪ WL-50 Wireless Controller
⑫ 8mm Videocassette
⑬ SS-300 Shoulder Strap
⑭ WS-20 Wrist Strap
⑮ BP-E77K / BP-E77KE or BP-E722 Battery Pack
⑯ CA-100 Compact Power Adapter
⑰ CB-110 Car Battery Adapter
⑱ DC-100 DC Coupler
⑲ MC-100 Multi-battery Charger
⑳ VHF Antenna
㉑ RU-100 RF Unit
㉒ TV
㉓ VCR
㉔ C-150 AV Cable
㉕ E60

Fig. I-3



❶ Torche vidéo VL-7
❷ Toche vidéo à batterie VL-20
❸ Convertisseur grand angle WD-37
❹ Convertisseur télé TL-37
❺ Jeu de filtres FS-37
❻ Jeu de filtres FS-37U
❼ Trépied
❽ Housse étanche RS-60
❾ Etui de transport souple SC-800
❿ Valise système HC-60
⓫ Télécommande sans fil WL-50
⓬ Vidéocassette 8 mm
⓭ Bandoulière SS-300
⓮ Dragonne WS-20
⓯ Batterie d'alimentation BP-E77K ou BP-E722
⓰ Adaptateur secteur compact CA-100
⓱ Adaptateur allume-cigare CB-110
⓲ Coupleur c.c DC-100
⓳ Chargeur multi-batteries MC-100
⓴ Antenne
㉑ Modulateur HF RU-100
㉒ Téléviseur
㉓ Magnétoscope
㉔ Convertisseur RGB-100
㉕ Transcodeur TC-E21
㉖ Câble AV C-150
㉗ Câble péritélévision PC-150
㉘ Camescope E60

2. Description of New Technology

2-1 Lens section

2-1-1 Optical system

The zoom lens installed on the model is a compact, lightweight and high-resolution lens of 8x (E61A, developed for 1/3 inch CCD.

When developing it, a stress was put on taking advantage maximum the fact that the CCD has changed from 1/2 inch to 1/3 inch and that the lens image circle has been reduced from ϕ8 to ϕ6 (compact and lightweight design).

The weight is further reduced by adoption of lightweight glass and decrease of number of lens pieces from 14 heretofore to 13.

Slightly reducing the opening F number improves a peripheral resolution to cope with a higher image quality.

Fig. I-4 shows the lens configuration for 1/2 inch CCD and 1/3 inch CCD.

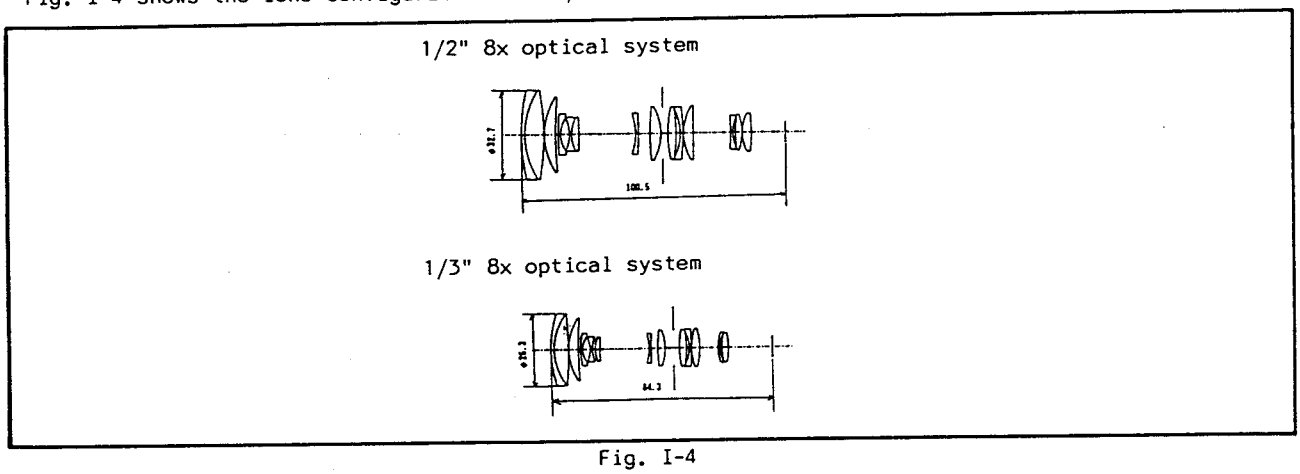


Fig. I-4

2-1-2 AF system

Employed on the model is an active AF by near infrared light which is conventionally used.

Basically, it is the same as the dual beam AF installed on E50E, E640E, etc. Considering compact design of shooting lens, a higher precision of AF is achieved by changing the balances of main and sub beam distance measuring area and the AF reference length from 26 to 30 mm.

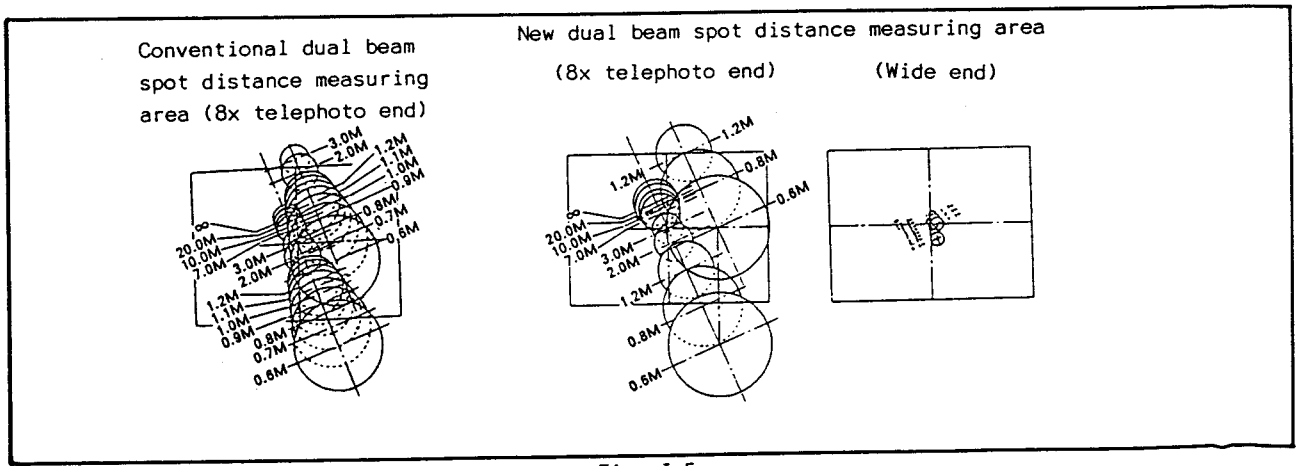


Fig. I-5

2-1-3 1/3 inch CCD

Along with compact and lightweight design of video camera, the CCD size has changed from 1/2 to 1/3 inch. Simply reducing the effective area of CCD would cause the following problem.

(1) If the pixel size is the same as on a conventional 1/2 inch CCD, the resolution drops.

(2) If the number of pixels is the same as on a conventional 1/2 inch CCD, the unit pixel area reduces, thereby lowering the sensitivity.

To cope with this problem, micro-lenses are arranged on the pixels of 1/3 inch CCD of 320,000 pixels installed. Improving the light collection rate and effective aperture rate obtains a sensitivity 1.5 times the conventional one.

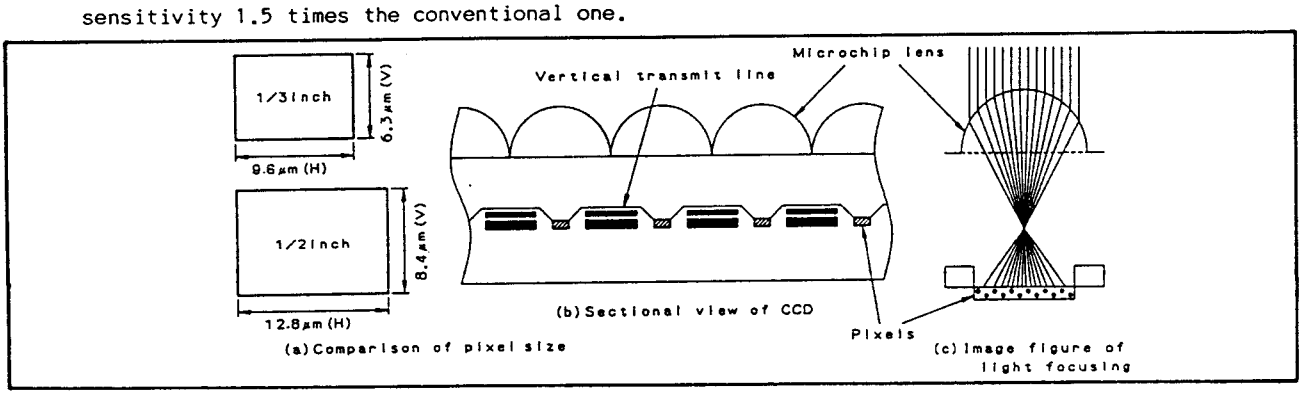


Fig. I-6

Reduction of unit pixel area incidental to intensive pixel design naturally reduces the photo-diode and vertical transfer CCD area, whereby the sensitivity and saturated electric charge balance would constitute a problem. Increasing the photo-diode area so as to take out more electric charge would narrow the vertical transfer CCD area, whereby the charge would overflow from the transfer line or decreasing it would lower the sensitivity.

So, micro-lenses are used for all pixels. The light which was conventionally irradiated on the vertical transfer line is effectively collected on photo-diodes. Thus the effective aperture is increased and the area distribution of photo-diodes and vertical transfer line is made appropriate.

2-2 Camera section

2-2-1 AWB (white extraction method)

For auto white balance, a white extraction method is added to the conventional uniaxial correction system thereby improving the accuracy.

With the white extraction method, the screen is divided into 25 parts, the color for each block is judged, and only a white block is used for color temperature control of white balance.

The range judged white is an area formed by a certain margin on both sides of color temperature axis. Within this range, the color change is equal to a case where a white object is shot under different lights and, even with different light sources, the white can be extracted.

If judged there is no white in any blocks, the white balance is locked until white is detected.

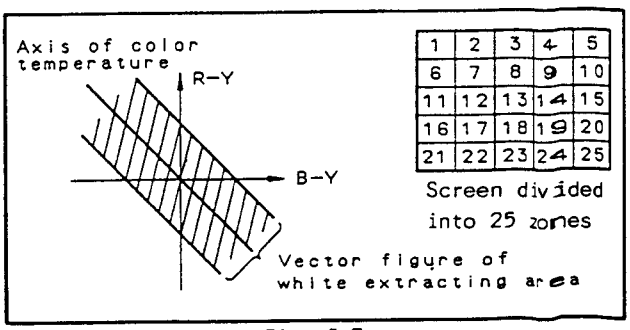


Fig. I-7

3. Circuit Board Configuration

Fig. I-8 shows circuit board positions.

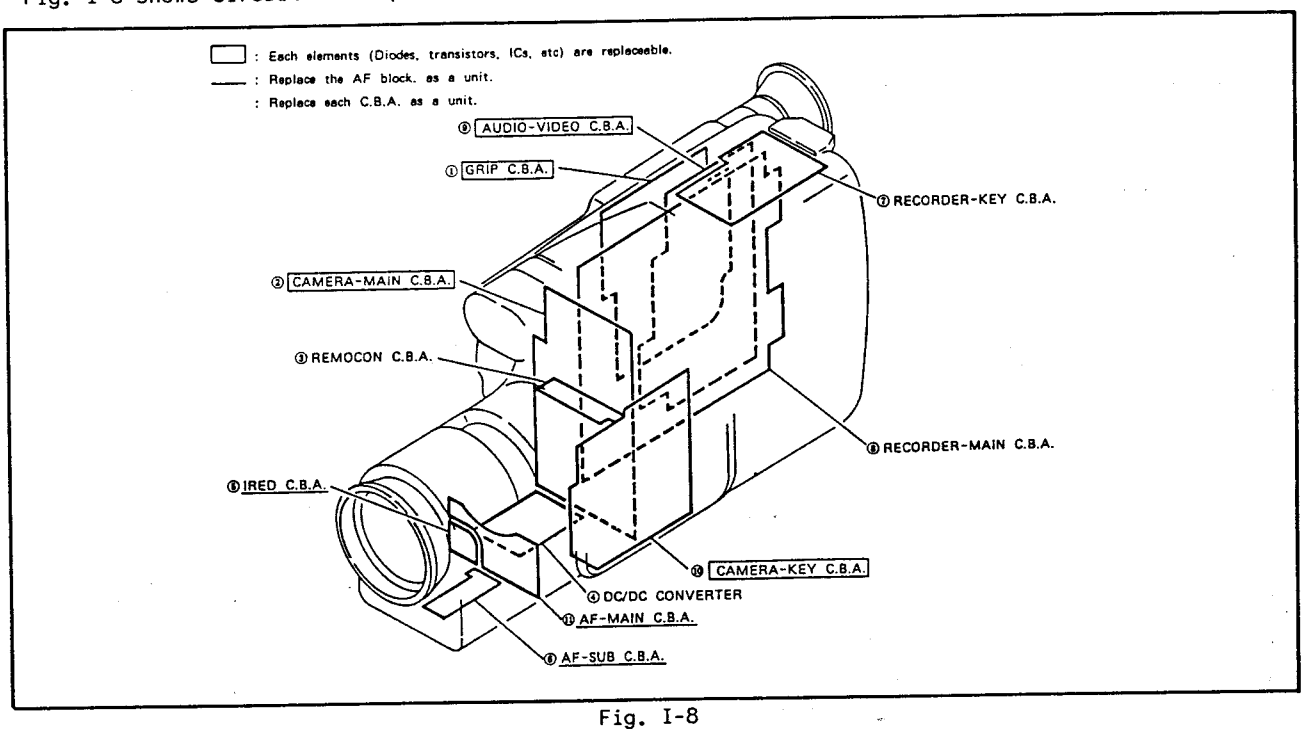


Fig. I-8

3-1 Outline of circuit boards

① GRIP C.B.A.
- Supplies power from the battery terminal to circuit boards. Fuses are provided.
- EVF drive circuit is provided. HD and VD are supplied as synchronizing signals to the character generator circuit.

② CAMERA-MAIN C.B.A.
- All CCD drive circuitry and camera signal processing circuitry are provided.

③ REMOCON C.B.A.
- Only a remote control beam detector element is provided.

④ DC/DC CONVERTER
- Converts 6 V DC into 5 V, +18 V and -8 V DC for C-MAIN C.B.A.

⑤ IRED C.B.A.
- AF infrared emission circuit board. Do not remove it because the circuit board position is adjusted. (For servicing, replace the AF block.)

⑥ AF-SUB C.B.A.
- AF microcomputer circuit board. (For servicing, replace the AF block.)

⑦ RECORDER-KEY C.B.A.
- A recorder key is installed.

⑧ RECORDER-MAIN C.B.A.
- VIDEO signal processing (recording, playback), servo and head amp circuits are provided.

⑨ AUDIO-VIDEO C.B.A.
- AUDIO signal processing circuit, A/V terminal and digital title mix circuit (E65A only) are provided.

⑩ CAMERA-KEY C.B.A.
- System control, character generator circuit, camera key and zoom motor drive circuit.

⑪ AF-MAIN C.B.A.
- AF infrared detector element, received infrared processing and AF motor drive circuits are provided.

4. Outline of Circuit Operation

4-1 Camera circuit operation

4-1-1 Power circuit

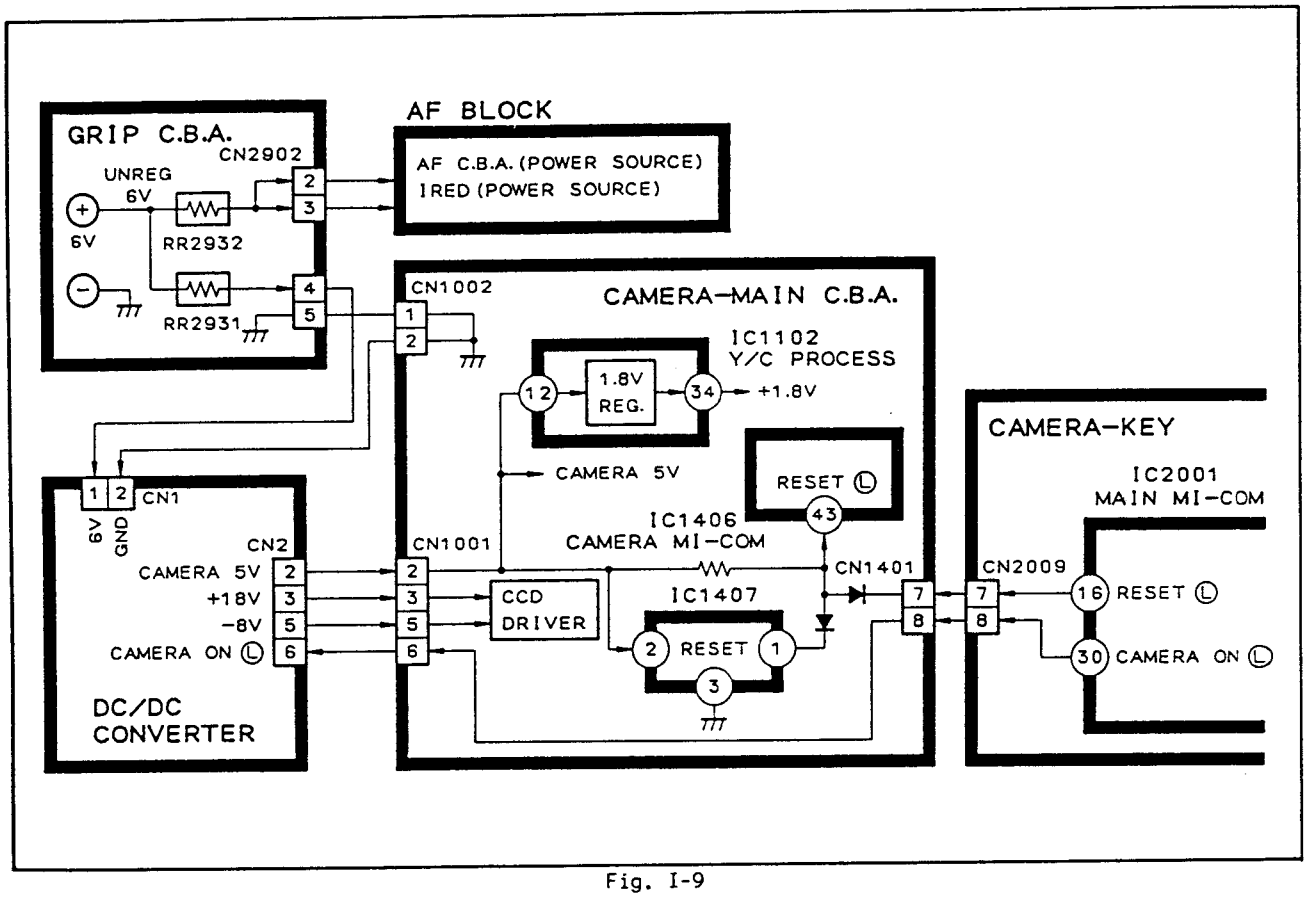


Fig. I-9

(1) Kinds of power source

The camera section power source is obtained by DC/DC CONVERTER FROM UNREG 6V of battery terminal. RR2931 is a protective semiconductor for camera power supply. GND line is strengthened by passing it through the CAMERA-MAIN C.B.A.

For AF section UNREG 6V via protective semiconductor RR2932 is used. One is for AF-MAIN C.B.A. and the other for IRED via AF-MAIN C.B.A.

° CAMERA 5V (+18V, -8V)

CAMERA ON L outputted from the main microcomputer (IC2001) pin 30 turns on the DC/DC CONVETER and outputs CAMERA 5V and CCD driving +18V and -8V.

° Reference voltage (+1.8V)

As a reference voltage for each circuit, IC1102 (Y/C PROCESS) generates +1.8V from CAMERA 5V.

(Resetting camera microcomputer)

At rise or fall front of CAMERA 5V, pin 1 of IC1407 goes "L" thereby resetting the camera microcomputer (IC1406).
When the mode changes from PLAY to CAMERA, RESET (L) is sent from the main microcomputer (IC2001) and resets the camera microcomputer.

4-1-2 CCD drive circuit

The CCD is an interline transfer system and its drive system is the same as heretofore. The CCD can directly be driven by H1, H2 and R pulses from the clock generator (IC1001) and, therefore, there is no drive circuit for the pulses.

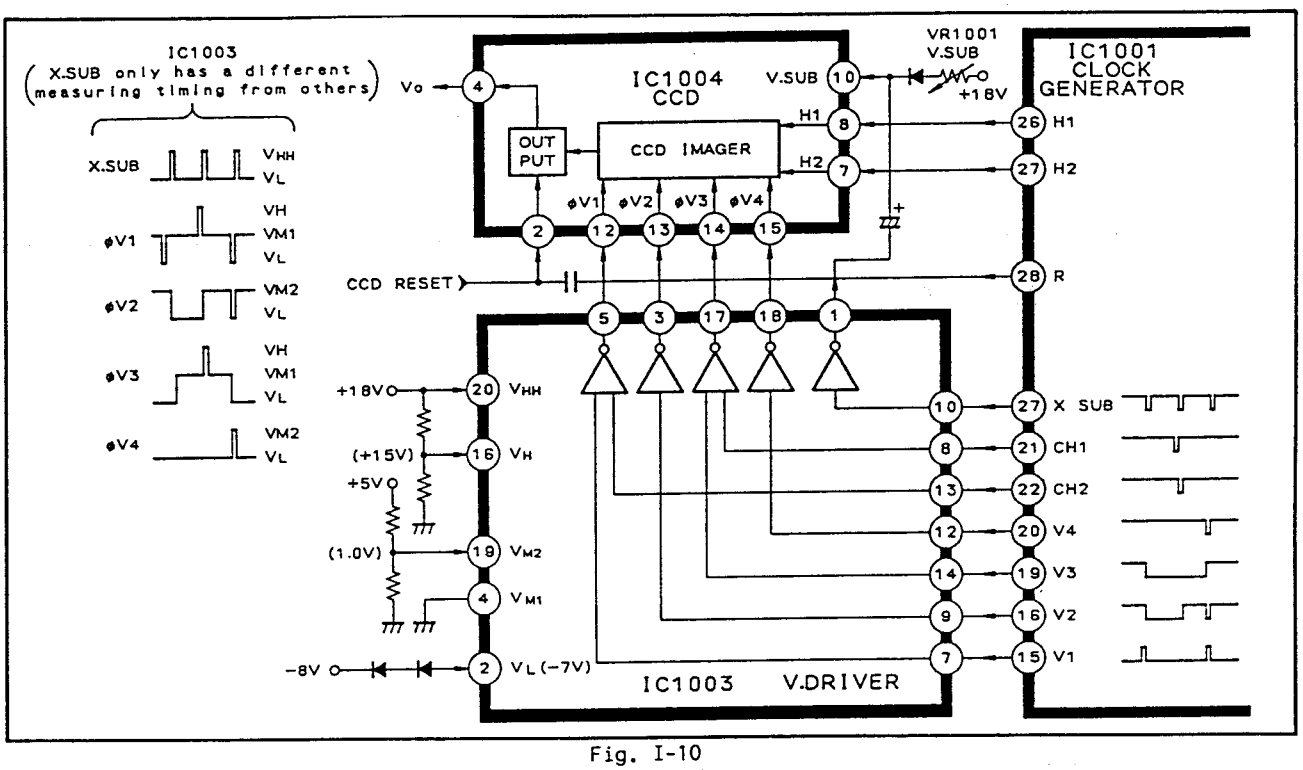


Fig. I-10

(1) V. DRIVER (IC1003)

All pulses outputted from the clock generator are binary (0V, 5V). The pulses are converted to voltages matching the CCD drive by this IC.

° 1 and φ V

Mix CH1 (3) and V1 (3) and, as shown on the right of Fig. I-10, invert them and convert them into voltages.

° 2 and φ V

Convert V2 (4) "L" section into VM2 and "H" into VL.

° X. SUB

Pulses outputted at a high speed electronic shutter. Convert "L" section into VHH and "H" into VL. At other than the high speed electronic shutter, the output is VL.

(2) CCD RESET

DC superposed on R (reset pulse). Select a value where the dynamic range of CCD will be a maximum.

(3) V. SUB (VR1001)

Select an appropriate voltage matching the CCD which suppresses blooming. If too high, the dynamic range of CCD will narrow or, if too low, blooming tends to appear.

4-1-3 Pulse signal generator circuit

Consists of two ICs IC1001 (CLOCK GENERATOR) and IC1002 (SSG).

IC1001 oscillates 19 MHz, which is halved and sent to IC1002 which divides that CLOCK and 17 MHz generated by itself to the same frequency. They are compared in phase as PLL operation. (Outputted from IC1002 pin 40 is an oscillation control voltage, which varies the oscillation frequency.)

IC1002 generates via its oscillation syncrhonizing signals and signal processing pulse.

Synchronizes with HD and VD sent from IC1002 and based on 19 MHz oscillation, IC1001 generates CCD drive pulse and signal processing pulse.

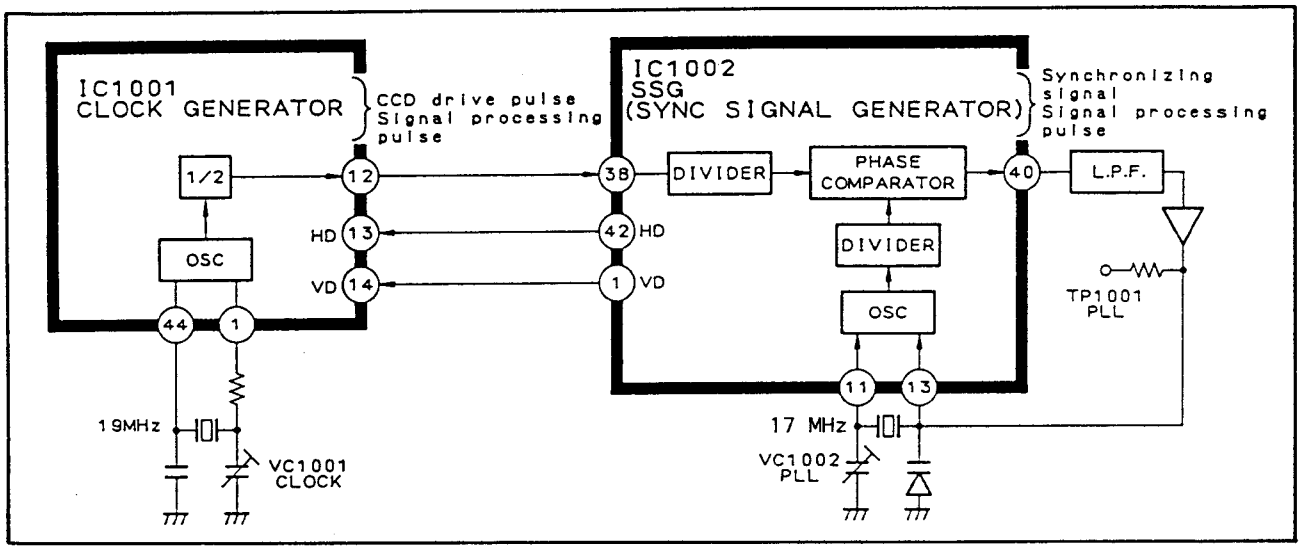


Fig. I-11

(1) Terminal function of IC1001 (CLOCK GENERATOR)

Table I-3 (1/2)

Pin No.	Signal designation	I/O	Function
1	X OUT	O	19 MHz X'TAL connection
2 3 4 5	SHUTTER 1 SHUTTER 2 SHUTTER 3 SHUTTER 4	I	Shutter speed change input terminal
6 7	NC	-	Open
8	FH/2	O	Line identification signal. Alternately goes H or L every cycle. H at 2B-G line. L at 2R-G line.
9	P BLK	O	Pre-blanking output.
10	CPOB	O	OB clamp pulse output.
11	NC	-	Open
12	CLK	O	Clock output. (9.5 MHz)
13	HD	I	Horizontal drive pulse input.
14	VD	I	Vertical drive pulse input.
15 16	V1 V2	O	CCD drive pulse. V.CCD transfer clock.

Table I-3 (2/2)

Pin No.	Signal designation	I/O	Function
17	VDD	I	CAMERA 5V
18	Vss	I	GND
19 20	V3 V4	O	CCD drive pulse. V.CCD transfer clock.
21 22	CH1 CH2	O	Sensor read pulses 1 and 2. (CCD)
23	NC	-	Open
24	X SUB	O	High speed electronic shutter control pulse. (Electron charge sweep-off pulse.)
25	VDD3	I	CAMERA 5V
26 27	H1 H2	O	CCD drive pulse. H.CCD transfer clock.
28	R	O	CCD output reset pulse.
29	Vss3	I	GND
30	RW1	I	Reset pulse width adjusting input.
31	RW0	O	Reset pulse width adjusting output.
32	SP1	O	CDS (correlation double sampling) pulse. (Pre-charge section)
33	SP2	O	CCD (correlation double sampling) pulse. (Signal section)
34	NC	-	Open
35	CSPO	O	CSP1, 2 pulse phase adjsuting output
36	CSPI	I	CSP1, 2 pulse phase adjusting input.
37	NC	-	Open
38	NTSC Ⓗ /PAL Ⓛ	I	TV system change terminal.
39	Vss2	I	GND
40	VDD2	I	CAMERA 5V
41 42	CSP1 CSP2	I	Sampling pulses 1, 2 (for color separation. Signal for alternately sampling at every pixel of CCD.)
43	NC	-	Open
44	X IN	I	19 MHz X'TAL connection.

(2) IC1002 (SSG)

For IC1002, add a comment of signal name.

① VD : vertical drive pulse output.
⑨ WBLK : wide blanking signal output.
⑮ SC : sub-carrier signal output. (B-Y)
⑯ SC(90): sub-carrier signal output. (B-Y)
⑳ BF : burst flag signal output.
㉖ CP2 : clamp pulse signal otuput.
㉗ CBLK : blanking pulse signal output.
㉘ SYNC : composite synchronizing signal output.
㊳ CLK : clock input from clock generator.
㊵ EO : PLL control voltage output.
㊷ HD : horizontal drive pulse output.

4-1-4 Signal processing circuit

In the signal processing circuit, there are new ICs for Y/C PROCESS (IC1102) and CHROMA MOD. (IC1301) but their circuit configuration remains the same as heretofore. (Fig. I-12).

Here, the description will be limited where particularly necessary. For the entire signal flow, refer to the camera block diagram.

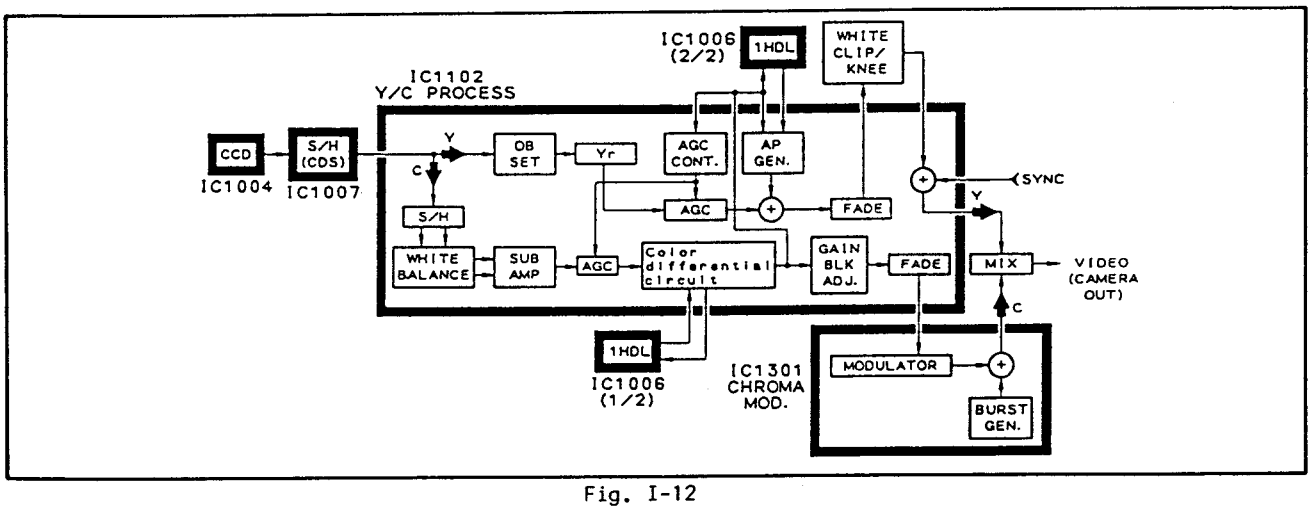


Fig. I-12

(1) AGC circuit

For AGC controlling signal, a brightness signal after 6 dB AMP of AGC is used.

A signal output from IC1102 (pin 49) is subjected to center-weighted average metering. By operational amplifier in IC1102, it is boosted with reference to AGC CONT (signal which performs AGC VR and BLC control) from D/A converter and, after integration, is sent to AGC CONT.

From AGC CONT., the brightness signal and the AGC control signal of chroma signal are output to control the AGC circuit.

The voltage of AGC MAX. CONT. applied to pin 42 drops at a gain-up, thereby raising the max. gain of AGC.

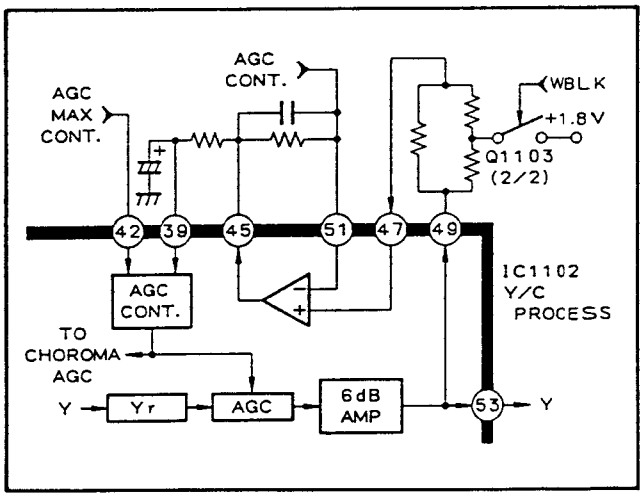


Fig. I-13

(2) High/low brightness suppressor circuit

The aperture signal suppressor circuit is cut by allowing pin 80 of IC1102 to go "H".

Y signal output from pin 53 is subjected to a knee, and inverted. That signal and AGC signal are applied to a chroma signal suppressor circuit. When a voltage is input to pin 78 is small (when high brightness signal section and AGC gain are high), the suppressor circuit suppresses the chroma signal.

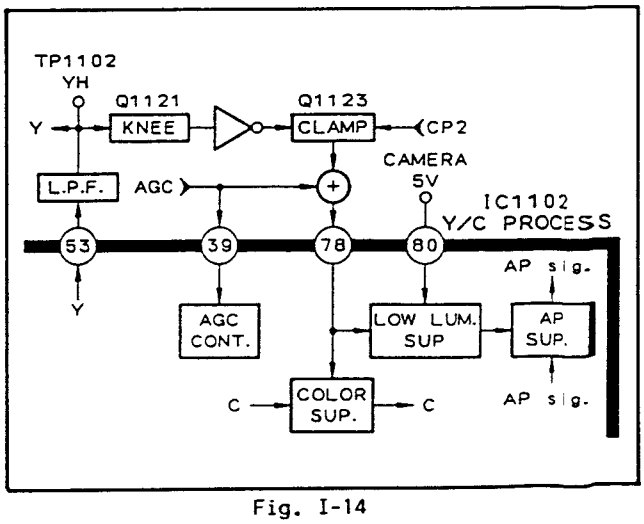


Fig. I-14

(3) Terminal function of IC1002 (Y/C PROCESS)

Table I-4

Pin No.	I/O	Function	Pin No.	I/O	Function
1	I	Character signal input (not used)	41	O	Chroma signal sub-amp output
2	I	Pre-blanking pulse input	42	I	AGC MAX. gain control
3	I	Brightness + aperture signal input	43	I	C AGC MAX. set (fixed)
4	I	Brightness pedestal control (fixed)	44	-	YH TRAP connecting terminal (OPEN)
5	O	Brightness + aperture + SYNC signal output	45	O	Operational amp. output
			46	-	DC controlling capacitor connection (C AGC)
6	I	Horizontal aperture gain control (fixed)			
			47	I	Operational amp. (+) input
7	O	Brightness + aperture signal output	48	I	VREF. +1.8V input
8	I	Fade black/white changeover (fixed to white)	49	O	AG controlling signal output
			50	-	DC controlling capacitor connection (WBO)
9	I	Composite synchronizing signal input			
10	I	R-Y gain control	51	I	Operational amp. (-) input
11	I	1HDL brightness signal input	52	I	Chroma low brightness suppression level control (+1.8V fixed)
12	I	Vcc1 (5V)			
13	I	Brightness signal input	53	O	YH output
14	I	R-Y matrix control (fixed)	54	I	Vcc2 (5V)
15	I	Vertical aperture gain control (fixed)	55	O	Edge chroma suppression signal test terminal (OPEN)
16	I	B-Y gain control			
17	O	Brightness signal 8 dB amp. output	56	-	DC controlling capacitor connection (YH)
18	I	B-Y matrix control (fixed)			
19	I	FH/2 pulse input	57	-	Cγ control signal trap connection (4.8 MHz)
20	I	DC controlling capacitor connection (V.AP)			
			58	-	NC
21	O	R-Y signal output	59	O	Ys signal output
22	I	GND	60	I	OB control
23	O	Chroma signal detection output 1 (OPEN)	61	I	CDS output signal input
			62	-	NC
24	I	R-Y pedestal control	63	I	CPOB pulse + white clip level (chroma) input terminal
25	O	B-Y signal output			
26	-	DC controlling capacitor connection (R-Y)	64	I	GND
			65	I	W.BLK 2 pulse input (OPEN)
27	O	Chroma signal detection output 2 (OPEN)	66	I	B.CONT input
			67	I	CSP1 pulse input
28	I	B-Y pedestal control	68	-	DC controlling capacitor connection (ALC not used)
29	I	Chroma signal input (OH)			
30	-	DC controlling capacitor connection (WB2)	69	I	CSP2 pulse input
			70	I	R.CONT input
31	I	Chroma signal input (1HDL)	71	O	ALC detection output
32	-	DC controlling capacitor connection (B-Y)	72	I	VREF. +1.8V input
			73	I	CP2 + C.BLK pulse input
33	O	Chroma signal AGC output	74	-	DC controlling capacitor connection (brightness singal)
34	O	+1.8 V output			
35	I	Chroma signal input	75	-	DC controlling capacitor connection (Cγ)
36	I	Chroma pedestal control			
37	O	Vertical aperture signal test terminal (OPEN)	76	I	Fade control signal input
			77	I	Brightness signal input
38	-	DC controlling capacitor connection (WB1)	78	I	Suppression signal input
			79	O	Horizontal aperture signal test terminal (OPEN)
39	I	AGC control signal input			
40	I	FH/2 offset control	80	I	Aperture suppression level control (5V: do not suppress)

(4) Terminal function of IC1301 (CHROMA MOD)

Table I-5

Pin No.	I/O	Function	Pin No.	I/O	Function
1	I	B-Y signal input	9	I	Vcc
2	I	GND	10	O	Chroma + burst signal output
3	I	Sub-carrier (SC) input	11	-	Clamping capacitor connection
4	I	90° control (fixed)	12	I	Burst flag (BF) input
5	-	Phase shifting capacitor terminal	13	I	Burst phase control
6			14	I	Sub-carrier (SC90) input
7	I	Burst amplitude control	15	I	R-Y signal input
8	I	Clamp pulse (CP2) input	16	I	V.REF (+1.8V)

4-1-5 Camera microcomputer peripheral circuits

Using two D/A converters (IC1404, 1405), the microcomputer output terminal is enlarged and using the terminal, most VRs are changed to D/A converters. (Instead of control by VR hertofore, a microcomputer control changes D/A converter output voltage.)

For AWB, BLC and KNEE control processed within microcomputer, Ys, YH, R-Y and B-Y signals gated by gate pulses are used. The gate pulse is changed over every V for AWB (25 divisions) and BLC (reverse light judge picture division) as shown in Fig. I-15 (b).

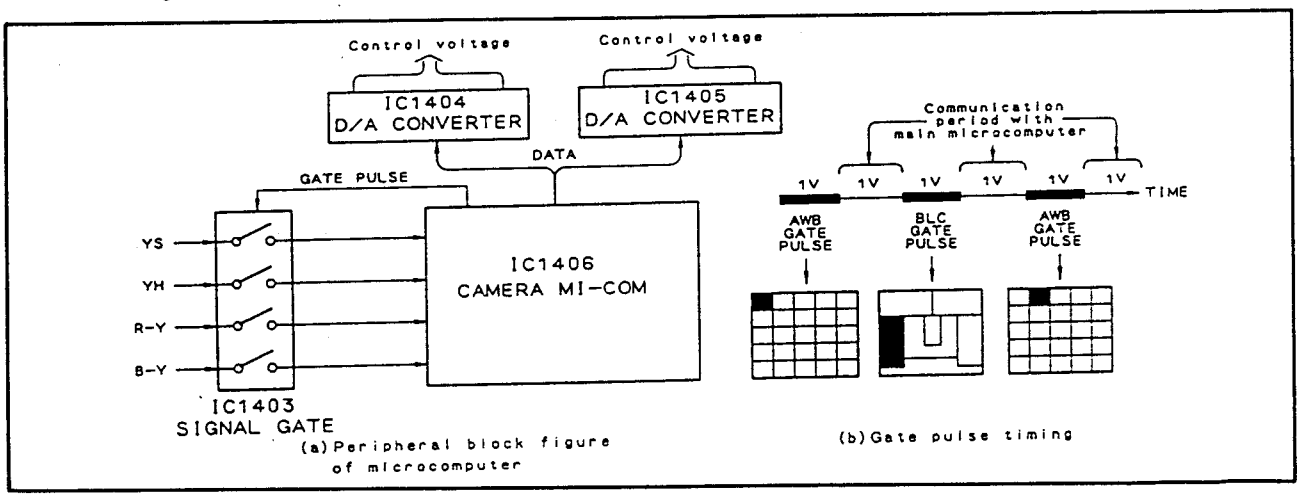


Fig. I-15

(1) Communication between D/A converter (IC1404, 1405) and microcomputer

Basically, data is sent every V from the microcomputer to D/A converter as unidirectional communication. Data is sent to IC1405 when turning on power or when changing the mode from PLAY to CAMERA. (IC1405 output port has the same role as conventional VR and, therefore, the data when operating is fixed.) Data is transmitted to IC1404 when any data has changed.

D/A converter does not load data unless "H" pulse rises in LDP.

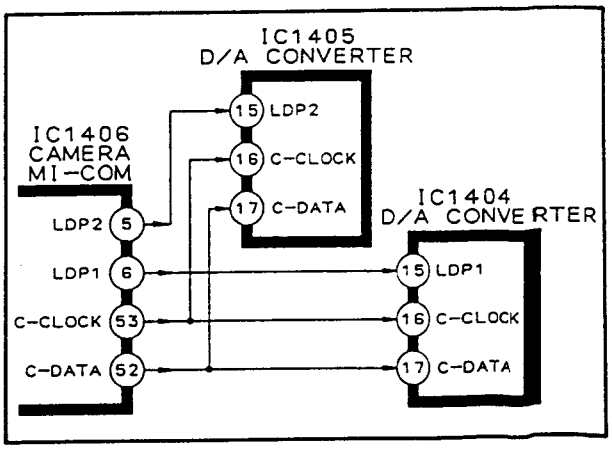


Fig. I-16

(2) Terminal function of IC1404 (D/A CONVERTER)

Table I-6

Pin No.	Signal designation	I/O	Function
1	Vss	I	GND
2	C. GAIN B	O	B-Y gain control
3	B CONT.	O	White balance control signal output (B)
4	AGC	O	Y AGC control
5	R CONT.	O	White balance control signal output (R)
6	C. GAIN R	O	R-Y gain control
7	AGC MAX CONT.	O	AGC max. gain control. Ordinary: 2.3 V. GAIN UP: 1.6 V.
8	IRIS	O	Auto iris control
9	A-FADE	O	Audio fade control signal output
10	VDD	I	CAMERA 5V
11	Vcc	I	CAMERA 5V
12	NC	-	Open
13			
14			
15	LDP1	I	Load pulse 1 input
16	C-CLOCK	I	Clock input from camera microcomputer
17	C-DATA	I	Data input from camera microcomputer
18	V-FADE	O	Video fade control signal output
19	KNEE	O	Knee control output
20	GND	I	GND

(3) Terminal function of IC1405 (D/A CONVERTER)

Table I-7

Pin No.	Signal designation	I/O	Function
1	Vss	I	GND
2	CCD RESET	O	CCD reset control
3	NC	-	Open
4	OFFSET	O	Color difference concurrency control
5	FH/2	O	FH/2 color difference step control
6	BL R	O	Carrier balance R control
7	BL B	O	Carrier balance B control
8	B PHASE	O	Burst phase control
9	O.B	O	OB set control
10	VDD	I	CAMERA 5V
11	Vcc	I	CAMERA 5V
12	NC	-	Open
13			
14			
15	LDP2	I	Load pulse 2 input
16	C-CLOCK	I	Clock input from camera microcomputer
17	C-DATA	I	Data input from camera microcomputer
18	NC	-	Open
19	W. CLIP	O	White clip control
20	GND	I	GND

4-1-6 Camera microcomputer (IC1406)

(1) Terminal function of camera microcomputer (IC1406)

Table I-8 (1/2)

Pin No.	Signal designation	I/O	Function
1	CP2	I	Pulse generating synchronizing signal input
2 3 4	NC	-	Open
5	LDP2	O	Serial data communicating load pulse signal output with D/A converter (IC1404, IC1405). When "H", D/A converter operates according to 12 bit data input before.
6	LDP1		
7	E^2PROM ON Ⓗ	O	Data is being written into E^2PROM.
8	GATE PULSE	O	25 divisions of picture. Multi pattern metering gate pulse.
9	SHUTTER 4	O	Shutter speed changing output.
10	SHUTTER 3		
11	SHUTTER 2		
12	SHUTTER 1		
13	R-Y	I	R-Y signal input for AWB.
14	Y IRIS	I	BLC controlling Y IRIS input.
15	B-Y	I	B-Y signal input for AWB.
16	V REF	I	Reference voltage input (+1.8 V)
17	Y AGC	I	Auto knee controlling Y AGC signal input.
18 19 20	-	I	Connected to GND.
21	A/D REF L	I	A/D conversion low limit voltage input (GND).
22	VRH A/P REF H	I	A/D conversion high limit voltage input (3.6 V).
23 24	Vss	I	Connected to GND.
25	MODE B	I	Microcomputer using aspect setting terminal. Fixed at "H".
26	NC	-	Open
27	MODE A	I	Microcomputer using aspect setting terminal. Fixed at "L".
28	CAMERA CS	I	Serial communicating chip select with main microcomputer (IC2001). Communication occurs during "L" period.
29 30	NC	-	Open
31	X OUT	O	8.4 MHz X'TAL connecting terminal.
32	NC	-	Open
33	X IN	I	8.4 MHz X'TAL connecting terminal.
34	FCH MODE	I	Factory function check mode setting terminal. Fixed at "H".
35	NC	-	Open
36	NTSC Ⓛ/PAL Ⓗ	I	TV system change terminal.
37	ADJ MODE	I	"H" selects camera service mode. Normally OPEN.
38 39 40	NC	-	Open
41	CG-STROBE	O	For plant adjustment.
42	NC	-	Open
43	RESET Ⓛ	I	Microcomputer reset signal input.

Table I-8 (2/2)

Pin No.	Signal designation	I/O	Function
44	NC	-	Open
45 46	-	I	External interrupt terminal. Not used. Fixed at "H".
47	C-REQ.	O	Camera microcomputer communication request signal. "L" selects communication request.
48	NC	-	Open
49	Vss	I	Connected to GND.
50	-	I	Communication system change terminal. Fixed at "H".
51	C-DATA OUT	O	Main microcomputer data output.
52	C-DATA	I/O	Main microcomputer data input. D/A converter data output.
53	CLOCK 1	I/O	Serial communicating clock input/output.
54	CLOCK 1 OUT Ⓗ	I	Select signal for input/output of pin 53. (Low for input, High for output)
55	VDD	I	Connected to CAMERA 5V.
56	-	I	Not used. Fixed at "H".
57 ~ 62	NC	-	Open
63	AWB SPEED	I	Used at factory adjustment. Speed-up "H".
64	VD	I	Pulse generating synchronizing signal input.

(2) Camera microcomputer (IC1406)

The camera microcomputer incorporates E^2PROM, which stores the following data.

① Camera adjusting data
Data for adjusting camera. Sent to D/A converter as a DC voltage.

② Basic data of camera
Reference data for different controls in microcomputer (AWB, knee, BLC, etc.)

③ Product specifications and TV system data
Sent to main microcomputer when turning on. (Type of character is set, also.)

④ Recorder adjusting data
Under-voltage adjusting data.

⑤ Character title data

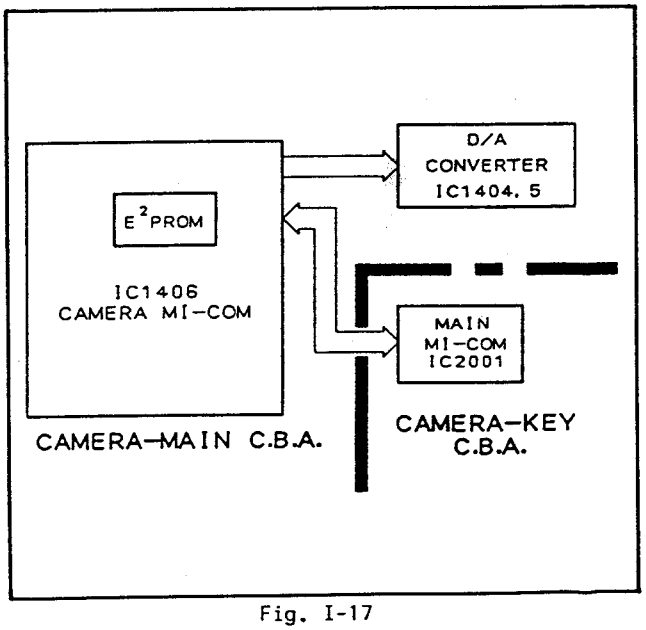


Fig. I-17

* The Adjustments for ①, ③ and ④ are necessary when replacing camera microcomputer or C-MAIN C.B.A. Note that the data in ② is already written in the service part of main microcomputer.

4-2 Recorder circuit operation

4-2-1 System control circuit

The system control is centered on the main microcomputer (IC2001) and servo microcomputer (IC401).

The main microcomputer reads a key and determines the mode. According to it, the servo microcomputer controls the recorder mechanism and video signal system.

The product specifications and under-voltage adjusting data are stored in E^2PROM of camera microcomputer (IC1406), which reads the data at the first communication after turning on.

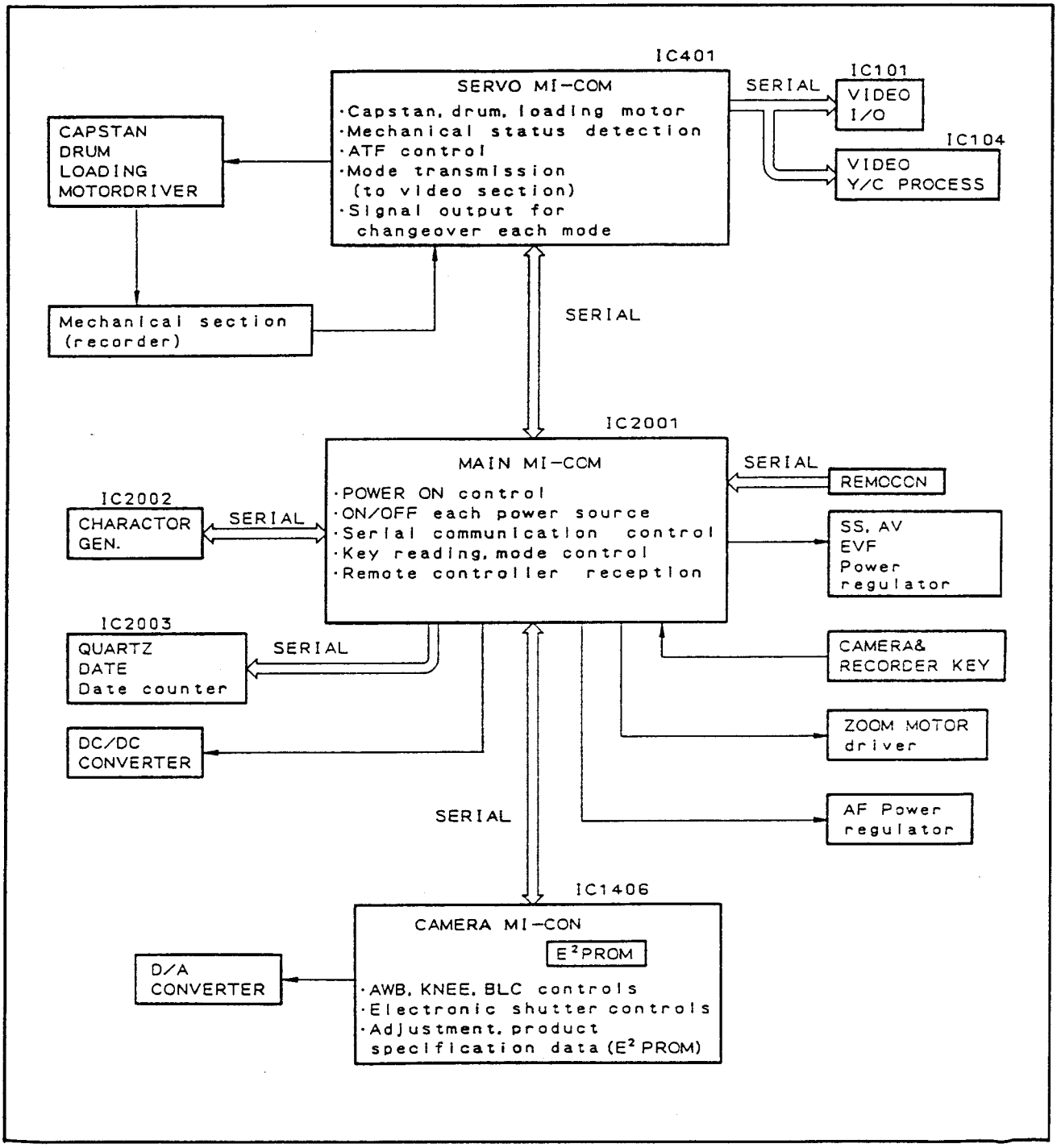


Fig. I-18

4-2-2 Power circuit

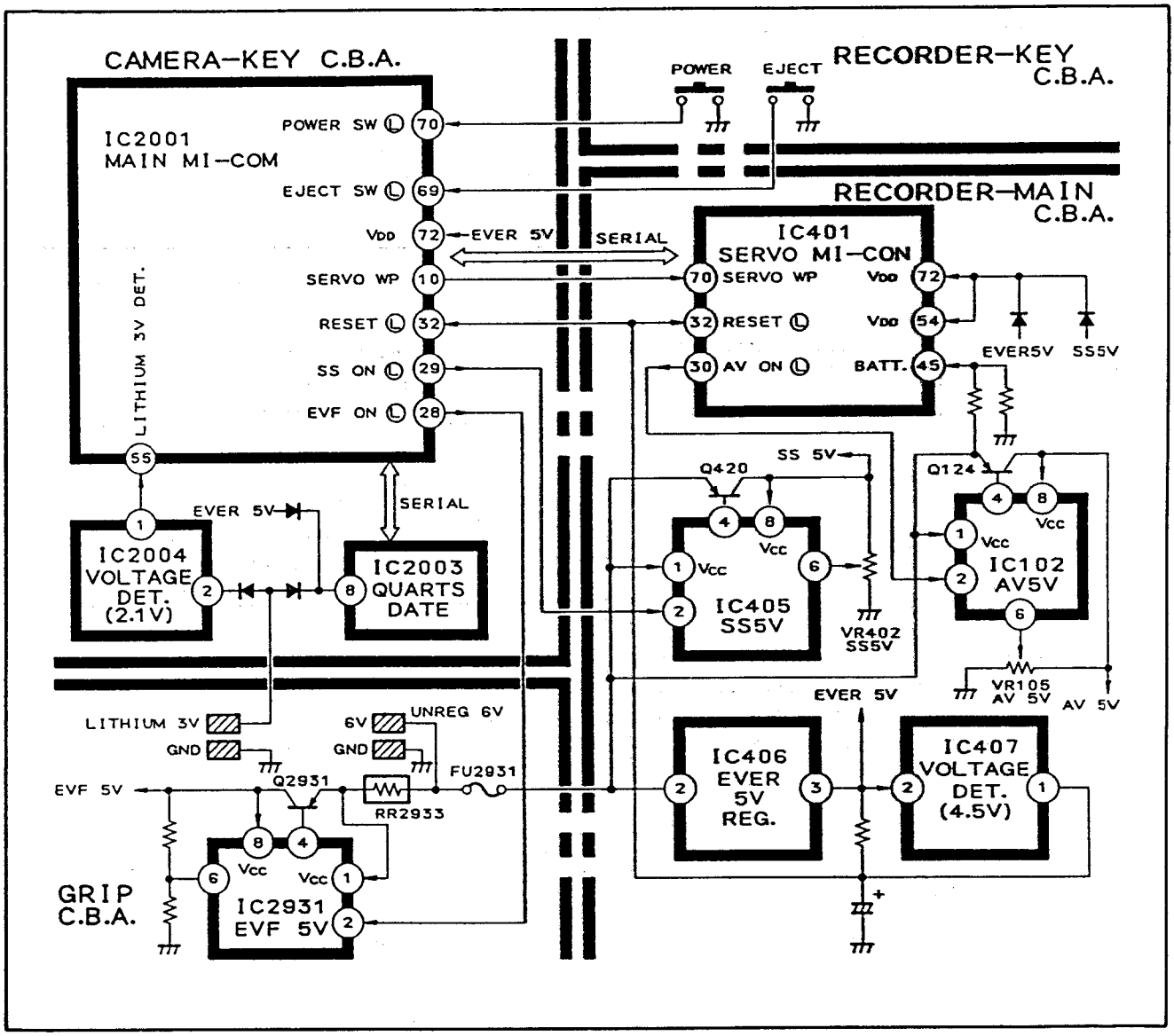


Fig. I-19

(1) Kinds of power source

The recorder section power is generated from UNREG 6V supplied from the battery terminal of GRIP C.B.A. For auto date backup, a lithium battery supplies 3V.

° EVER 5V
When power is supplied to the battery terminal, it is converted to 5V by 3 terminal regulator (IC406) on R-MAIN C.B.A. It is outputted so long as power is supplied and is mainly used for energizing the microcomputers.

° SS 5V
When turning on the power SW, the main microcomputer (IC2001) outputs SS ON Ⓛ via pin 29, operates IC405 and Q420 and outputs SS 5V. It is used for energizing the servo system.

° AV 5V
Turning on the power SW sends information from the main microcomputer to the servo microcomputer (IC401) which, in turn, outputs AV ON Ⓛ via its pin 30, operates IC102 and Q124 and outputs AV 5V. It energizes the video system.

• EVF 5V

Turning on the power SW outputs EVF ON Ⓛ from main microcomputer pin 28, operates IC2931 and Q2931 and outputs EVF 5V. It energizes EVF.

• LITHIUM 3V

3V DC supplied from the lithium battery (GRIP C.B.A.) energizes the quartz date (IC2003) when no power is supplied to the battery terminal. When power is supplied, EVER 5V energizes the quartz date. (At power-on state: EVER 5V + SS 5V)

(2) SS 5V, AV 5V and EVF 5V drive circuit

It starts operating when IC pin 2 goes "L". Comparing the voltage inputted to pin 6 with the internal reference voltage, it drives the transistor so as to keep that voltage constant.

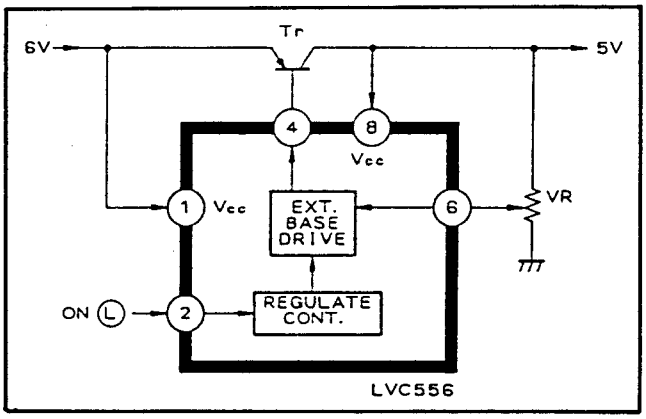


Fig. I-20

(3) Starting up power supply

• Resetting when installing power supply

Connecting power to the battery terminal supplies EVER 5V from R-MAIN C.B.A. IC406 to the main microcomputer and servo microcomputer and outputs from IC407 a reset signal ("L" for resetting), which resets the main and servo microcomputers.
After reset, the main and servo microcomputers transfer to a sleep mode and stand by.

• Operation when turning on

Turning on the power SW applies POWER SW Ⓛ signal to the main microcomputer, which starts an operation and outputs SERVO WP, SS ON Ⓛ and EVF ON Ⓛ signals.
When SERVO WP ("L" pulse) is sent from the main microcomputer, the servo microcomputer starts an operation and outputs AV ON Ⓛ signal. It starts up power of SS, AV and EVF.

• Operation when turning off

Pressing the power SW when power is turned on applies POWER SW Ⓛ signal to the main microcomputer, which notifies POWER OFF to the servo microcomputer in serial data. The servo microcomputer turns the mechanism to the STOP mode, then notifies it to the main microcomputer in serial data and shuts down each power.

• Operation at power OFF eject

Pressing the eject SW applies EJECT SW Ⓛ signal to the main microcomputer, which starts an operation and outputs SERVO WP and SS ON Ⓛ signals. The servo microcomputer starts an operation by SERVO WP and starts ejecting by a serial data from the main microcomputer. When the eject operation is completed, it notifies the fact to the main microcomputer in serial data and, after shutting down power, the servo and main microcomputers transfer to the sleep mode.

(4) Resetting QUARTZ DATE (IC2003)

IC2003 uses the EVER 5V and LITHIUM 3V as power sources. It notifies the fact to the main microcomputer in serial data when turning on power. Upon its receipt, the main microcomputer resets data of auto date and tape counter in IC2003 by serial data.

4-2-3 Terminal function of main microcomputer (IC2001)

Table I-9 (1/2)

Pin No.	Signal designation	I/O	Function
1	CAMERA-CS	O	Camera microcomputer communication allowed at "L".
2	SERVO CS	O	Servo microcomputer communication allowed at "L".
3 4 5 6	S. LEVEL 4 S. LEVEL 3 S. LEVEL 2 S. LEVEL 1	O	Basic output of digital title fetch level (threshold level output). Combination of 4 bits changes the threshold level of fetch level to 16 steps.
7	TALLY	O	Tally LED ON/OFF control. ON at "H".
8	WIDE	O	Zoom motor wide side drive signal. Drive at "H".
9	TELE	O	Zoom motor tele side drive signal. Drive at "H".
10	SERVO WP	O	Servo microcomputer start signal. Servo microcomputer starts with "L" pulse.
11	PB-RF DET Ⓛ	O	Detecting PB-RF outputs "L".
12	PLAY LED	O	PLAY LED ON/OFF control. ON at "H".
13	CAMERA LED	O	CAMERA LED ON/OFF control. ON at "H".
14	NC	-	Open
15	DM ON Ⓛ	O	Digital memory indication ON/OFF control. Indicated at "L".
16	RESET Ⓛ (CAMERA)	O	Camera microcomputer reset signal. Outputs "L" when starting up the camera power supply and resets the camera microcomputer.
17 ∫ 22	NC	-	Open
23	E^2PROM ON	I	"H" is input during E^2PROM write. Inhibits camera power OFF while writing.
24	SERV2	I	Used for function check in plant.
25	SERV1		
26	FCH ON		
27	LIGHT CONT.	O	Video light power supply, ON permit signal output. Can be turned on at "H". Outputs "H" during REC PAUSE or REC.
28	EVF ON Ⓛ	O	EVF 5V, ON/OFF control signal. ON at "L".
29	SS ON Ⓛ	O	SS 5V, ON/OFF control signal. ON at "L".
30	CAMERA ON Ⓛ	O	Camera power supply (DC/DC converter), ON/OFF control signal. ON at "L".
31	-	I	Connected to GND.
32	RESET Ⓛ (MAIN)	I	Main microcomputer reset signal input. Reset at "L" period.
33	Vss	I	Connected to GND.
34	X OUT	O	Ceramic resonaor connecting terminal.
35	X IN	I	
36	-	I	Connected to GND.
37	S-DATA	I	Data input for serial communication with SERVO MI-COM, QUARTZ DATE.
38	S-DATA	O	Data output for serial communication with SERVO MI-COM, QUARTZ DATE, CHARACTER GEN.
39	CLOCK 2	O	Clock output for serial communication with SERVO MI-COM, QUARTZ DATE, CHARACTER GEN.
40	NC	-	Open
41	C-DATA	I	Data input for serial communication with CAMERA MI-COM.
42	C-DATA	O	Data output for serial communication with CAMERA MI-COM.
43	CLOCK 1	O	Clock output for serial communication with CAMERA MI-COM.
44	FCH SEL	I	Used for function check in plant.
45	BATT. DET.	I	Battery voltage detecting terminal. (Not used.)

Table I-9 (2/2)

Pin No.	Signal designation	I/O	Function
46	CG SEL	I	Employed character generator IC dhange terminal. "H"
47	PB-RF DET. Ⓗ	I	PB-RF detect signal input. Detect at "H". If PB-RF is not detected, tape count stops.
48	KEY 4	I	Recorder key input.
49	KEY 3		
50	KEY 2	I	Camera key input.
51	KEY 1		
52	Vss	I	GND
53	Vref	I	EVER 5V
54	VDD	I	EVER 5V
55	LITHIUM 3V DET.	I	Lithium battery under-voltage detection. When voltage of LITHIUM 3V (pin 2 of IC2004) via diode drops below 2.1 V, "L" is input. (Detects under-voltage at approx. 2.5 V as lithium battery voltage.)
56	REMOCON	I	Transmit code input from remote controller.
57	WIDE SW Ⓛ	I	Zoom switch input.
58	TELE SW Ⓛ		
59	TRIG. SW Ⓛ	I	Trigger switch input.
60	-	-	Connected to GND.
61	CAMERA REQ	I	Communication request from camera microcomputer. Request at "L".
62	SERVO REQ	I	Communication request from servo microcomputer. Request at "L".
63	NC	-	Open
64			
65	SRAM-CS	O	Communication permit for digital title memory SRAM. Outputs "H" in digital title mode and performs communication of SRAM and controller in DM C.B.A.
66	NC	-	Open
67			
68	AF ON Ⓗ	O	AF ON/OFF control signal. "H" at auto focus.
69	EJECT SW Ⓛ	I	Eject SW input termifnal.
70	POWER SW Ⓛ	I	Power SW input terminal.
71	VDD	I	EVER 5V
72	VDD	I	EVER 5V
73	Vss	I	GND
74	-	-	Connected to EVER 5V.
75	QD-WRITE	O	QUARTZ DATE IC (IC2003) write signal. Write at "L".
76	QD-CS	O	Communication permit with QUARTZ DATE IC (IC2003) write signal. Permit at "L".
77	NC	-	Open
78	DM-CS	O	Communication permit with digital memory controller (IC2701). Permit at "L".
79	CG-CS	O	Communication permit with character generator (IC2002). Permit at "L". (E61A or E63A only.)
80	CG-STROBE	O	Character generator data select signal. Active "H".

4-2-4 Terminal functions of SERVO microcomputer (IC401)

Table I-10 (1/3)

<table>
<tr><th>Pin No.</th><th>Signal designation</th><th>I/O</th><th>Function</th></tr>
<tr><td>1</td><td>SEL 1</td><td>O</td><td>Used for controlling the frequencies of ATF PILOT signal.
<table>
<tr><td>PILOT</td><td>f1</td><td>f2</td><td>f3</td><td>f4</td></tr>
<tr><td>SEL 1</td><td>H</td><td>L</td><td>H</td><td>L</td></tr>
<tr><td>SEL 2</td><td>H</td><td>H</td><td>L</td><td>L</td></tr>
</table></td></tr>
<tr><td>2</td><td>SW PULSE</td><td>O</td><td>Head switching pulse output.</td></tr>
<tr><td>3</td><td>PB Ⓗ/EE Ⓛ</td><td>O</td><td>Head switching pulse output.
When the playback mode is selected, this signal goes 'High'.</td></tr>
<tr><td>4</td><td>JOG Ⓗ</td><td>O</td><td>Time constant changeover signal for the RF AGC circuit.
When the accelerated/decelerated playback operation is performed, this signal goes 'High'.</td></tr>
<tr><td>5</td><td>A-MUTE Ⓗ</td><td>O</td><td>Audio mute signal.
For audio muting, this signal goes 'High'.</td></tr>
<tr><td>6</td><td>NC</td><td>-</td><td>Open</td></tr>
<tr><td>7</td><td>LINE IN Ⓛ</td><td>O</td><td>AV terminal input/output select signal.
When the line input is selected, this signal goes 'Low'.</td></tr>
<tr><td>8</td><td>NC</td><td>-</td><td>Open</td></tr>
<tr><td>9</td><td>NC</td><td>-</td><td>Open</td></tr>
<tr><td>10</td><td>ME Ⓗ/MP Ⓛ</td><td>O</td><td>ME/MP tape check input.
According to the hole on cassette, it is checked whether the ME or MP tape is used.
This signal becomes 'High' when the ME tape is used, and it becomes 'Low' when the MP tape is used.</td></tr>
<tr><td>11</td><td>DRUM FWD Ⓛ</td><td>O</td><td>Forward/reverse drive select signal for the drum motor.
When the drum motor is driven in the forward direction, this signal goes 'Low'.</td></tr>
<tr><td>12</td><td>CAPSTAN TORQUE Ⓗ</td><td>O</td><td>This signal goes 'High' when the torque of capstan motor is increased.</td></tr>
<tr><td>13</td><td>CAPSTAN FWD Ⓗ</td><td>O</td><td>Forward/reverse drive select signal for the capstan motor.
When the capstan motor is driven in the forward direction, this signal goes 'High'.</td></tr>
<tr><td>14</td><td>CAPSTAN ON Ⓗ</td><td>O</td><td>Capstan motor on/off signal.
This signal goes 'High' when the capstan motor turn on.
It is goes 'Low' when the capstan motor turns off (braking).</td></tr>
<tr><td>15</td><td>DRUM BRAKE Ⓗ</td><td>O</td><td>When braking is applied to the drum motor, this a signal goes 'High'.</td></tr>
<tr><td>16</td><td>NC</td><td>-</td><td>Open</td></tr>
<tr><td>17</td><td>NC</td><td>-</td><td>Open</td></tr>
<tr><td>18</td><td>JOG VD</td><td>O</td><td>Pseudo VD output inserted into the video signal in the accelerated/decelerated playback operation.</td></tr>
<tr><td>19
20
21</td><td>MODE SW3
MODE SW2
MODE SW1</td><td>I
I
I</td><td>Mechanical mode switch input.
(3-bit configuration; for detection of mechanism position)</td></tr>
<tr><td>22</td><td>CASSETTE DOWN Ⓛ</td><td>I</td><td>Cassette compartment down switch input.
This signal goes 'High' when the cassette compartment is moved up, and it goes 'Low' when the cassette compartment is moved down.</td></tr>
<tr><td>23</td><td>SAFETY TAB Ⓗ</td><td>I</td><td>This signal becomes 'Low' when the safety tab of cassette is set to the write-inhibit position (for preventing unintentional erasure).</td></tr>
</table>

Table I-10 (2/3)

Pin No.	Signal designation	I/O	Function
24	HiMP Ⓗ	I	HiMP tape check input. According to the hole on cassette, it is checked whether the HiMP tape is used. When the HiMP tape is used, this signal goes 'High'.
25	MP Ⓗ /ME Ⓛ	I	ME/MP tape check input. According to the hole on cassette, it is checked whether the ME or MP tape is used. This signal goes 'Low' when the ME tape is used, and t goes 'High' when the MP tape is used.
26	S Ⓛ /COMP Ⓗ	I	S/COMP terminal select signal. Connected with 5V.
27	TAPE SENS. LED	O	BOT/EOT detective LED control signal. This signal is used whether the beginning or end of tape is reached.
28	SP Ⓗ /LP Ⓛ	O	Unused.
29	AUDIO ON Ⓛ	O	Audio power control signal. (Not used.)
30	AV ON Ⓛ	O	AV 5V REG CONTROL SIGNAL. When this signal goes 'Low' the AV 5V REG function is turned on.
31	-	-	Unused.
32	RESET Ⓛ	I	Microcomputer reset input. The microcomputer is reset while this signal is 'Low'.
33	Vss	-	Connected with ground.
34 35	X OUT X IN	O I	Connected with the ceramic oscillator.
36	-	-	Connected with 5V via resistor.
37	-	-	Connected with ground via resistor.
38	-	-	Connected with ground via resistor.
39	-	-	Connected with ground via resistor.
40	-	-	Connected with ground via resistor.
41	S-DATA IN	I	Data input for serial communication with the main microcomputer (IC2001).
42	S-DATA OUT	O	Data output for serial communication with the main microcomputer (IC2001). Video ICs (IC101, IC104).
43	S-CLOCK	I	Clock input for serial communication with the main microcomputer (IC2001)
		O	Clock output serial communication with the video ICs (IC101, IC104).
44	DEW Ⓗ	I	Dew (moisture condensation) sensor input.
45	BATT. LEVEL	I	Used fore detecting the excessively low voltage level of battery.
46	T REEL FG	I	Takeup-reel FG input.
47	S REEL FG	I	Supply-reel FG input.
48	-	-	Connected with 5V via resistor.
49	NC	-	Open
50	SW POINT ADJ.	I	Used for adjusting the switching point.
51	ATF ERROR	I	ATF error input.
52	Vss	-	Connected with ground.
53	VREF	I	Connected with EVER 5V.
54	VDD	I	Connected with EVER 5V.
55	BOT SENS. Ⓛ	I	On detection of the beginning of tape, this signal goes 'Low' (the relevant LED indicator lights up).
56	D-PG	I	Input terminal for drum PG signal.

Table I-10 (3/3)

<table>
<tr><th>Pin No.</th><th>Signal designation</th><th>I/O</th><th>Function</th></tr>
<tr><td>57</td><td>EOT SENS. Ⓛ</td><td>I</td><td>This signal goes 'Low' when the end of tape is detected and LED lights up.</td></tr>
<tr><td>58</td><td>C-SYNC</td><td>I</td><td>Sync signal input for rotation servocontrol.</td></tr>
<tr><td>59</td><td>Hi8 DET Ⓗ</td><td>I</td><td>Tape detection input for playback.
Connected with ground.</td></tr>
<tr><td>60</td><td>D-PG</td><td>I</td><td>Drum PG input.</td></tr>
<tr><td>61</td><td>D-FG</td><td>I</td><td>Drum FG input.</td></tr>
<tr><td>62</td><td>C-FG</td><td>I</td><td>Capstan FG input.</td></tr>
<tr><td>63
64</td><td>LOAD Ⓗ
UNLOAD Ⓗ</td><td>O</td><td>Loading motor control singal.
<table>
<tr><th>Operation / Signal</th><th>LOAD</th><th>UNLOAD</th><th>BRAKE</th></tr>
<tr><td>LOAD Ⓗ</td><td>H</td><td>L</td><td>H</td></tr>
<tr><td>UNLOAD Ⓗ</td><td>L</td><td>H</td><td>H</td></tr>
</table></td></tr>
<tr><td>65</td><td>VIDEO-CS</td><td>O</td><td>Chip select signal for serial data communication with the video ICs (IC101, IC104).
Serial data communication is carried out while this signal is 'Low'.</td></tr>
<tr><td>66</td><td>SERVO REQ</td><td>O</td><td>Outputs communication request signal to main microcomputer (IC2001).
Communicable during "L" period.</td></tr>
<tr><td>67</td><td>D-PWM</td><td>O</td><td>Drum motor drive signal.</td></tr>
<tr><td>68</td><td>C-PWM</td><td>O</td><td>Capstan motor drive signal.</td></tr>
<tr><td>69</td><td>ATF LOCK Ⓛ</td><td>I</td><td>This signal goes 'Low' when the ATF phasing is locked normally in the ATF phase servoloop for playback.</td></tr>
<tr><td>70</td><td>SERVO WP</td><td>I</td><td>SERVO microcomputer start signal.
The SERVO microcomputer is started when this signal goes 'Low'.</td></tr>
<tr><td>71</td><td>VDD</td><td>I</td><td>Connected with EVER 5V.</td></tr>
<tr><td>72</td><td>VDD</td><td>I</td><td>Connected with EVER 5V.</td></tr>
<tr><td>73</td><td>Vss</td><td>-</td><td>Connected with ground.</td></tr>
<tr><td>74</td><td>-</td><td>-</td><td>Connected with EVER 5V.</td></tr>
<tr><td>75</td><td>SW PULSE 1</td><td>O</td><td>Overlap recording control signal for CH-1 head ON/OFF switch.</td></tr>
<tr><td>76</td><td>FE ON Ⓛ</td><td>O</td><td>FE head turn-on control signal.
This signal goes 'High' for erasure.</td></tr>
<tr><td>77</td><td>SW PULSE 2</td><td>O</td><td>Overlap recording control signal for CH-2 head ON/OFF switch.</td></tr>
<tr><td>78</td><td>TS B</td><td>O</td><td>TAF error level hold B.</td></tr>
<tr><td>79</td><td>ATF SW</td><td>O</td><td>ATF BPF changeover signal.
This signal goes 'Low' when an ATF error is detected on f1/f3 track, and it goes 'High' when an ATF error is detected on f2/f4 track.</td></tr>
<tr><td>80</td><td>SEL 2</td><td>O</td><td>ATF pilot signal frequency control.
Refer to the description of pin 1.</td></tr>
</table>

4-2-5 Data communication

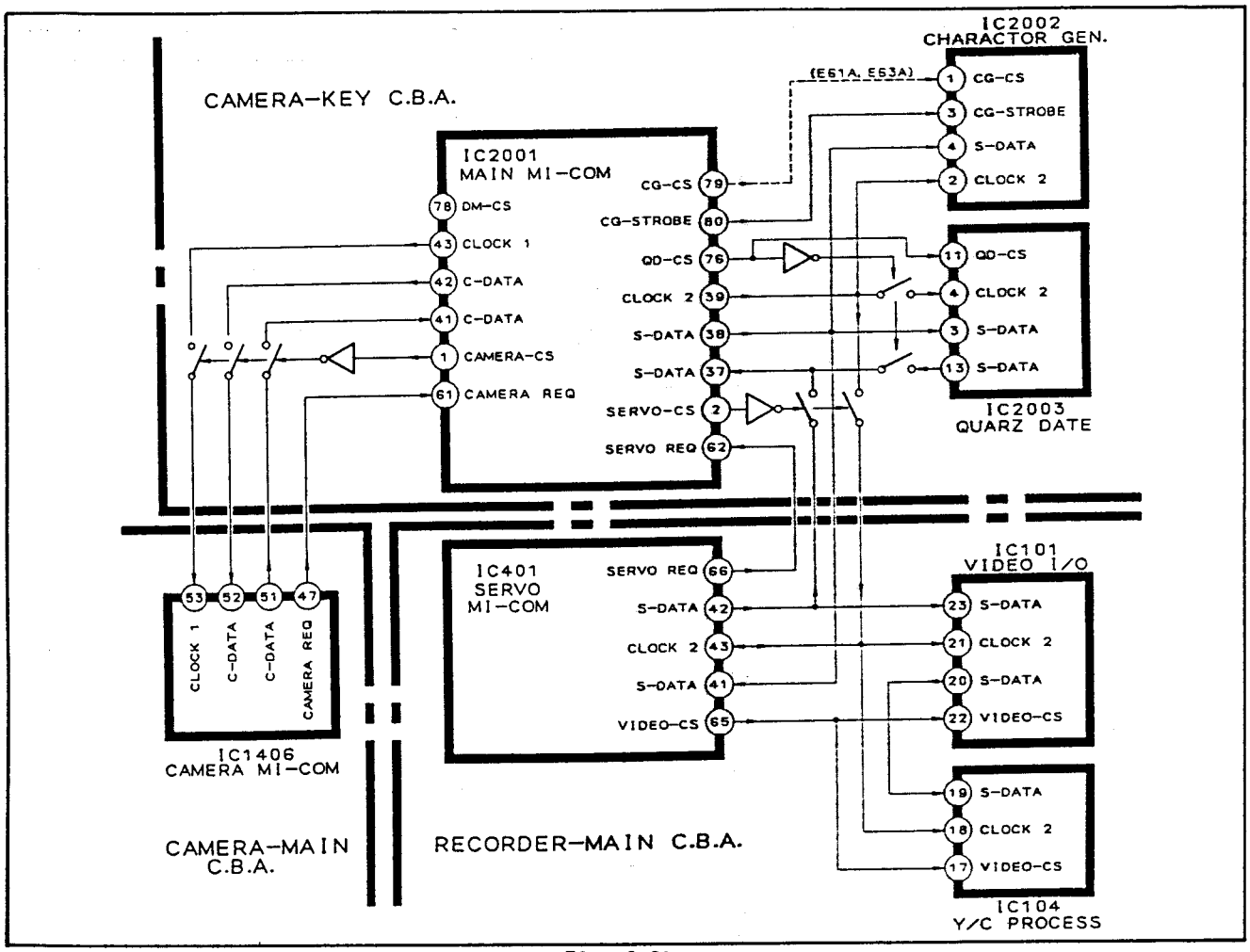


Fig. I-21

The data communication between microcomputer and IC is centered on the main microcomputer and is classified as follows.

Bi-directional communication

- Main microcomputer ⟷ servo microcomputer
- Main microcomputer ⟷ camera microcomputer
- Main microcomputer ⟷ quartz date IC

Unidirectional communication

- Main microcomputer ⟶ character generator
- Servo microcomputer ⟶ video signal processing IC

(1) Between main microcomputer and servo microcomputer

The data communication between the main microcomputer (IC2001) and servo microcomputer (IC401) is performed bi-directionally with 8 bits and 8 words. Operation commands to the servo microcomputer, mechanism information to the main microcomputer and other data are transmitted and received. (1 communication per V.)

1) The servo microcomputer lowers to "L" the SERVO REQ signal at pin 66 to deliver a communication request to the main microcomputer.

   Then the main microcomputer lowers to "L" the SERVO-CS of pin 2 to connect the communication line. A serial communication starts.

2) After end of data transmission and reception, the main microcomputer changes SERVO-CS to "H" and the servo microcomputer changes SERVO REQ to "H" to terminate the communication.

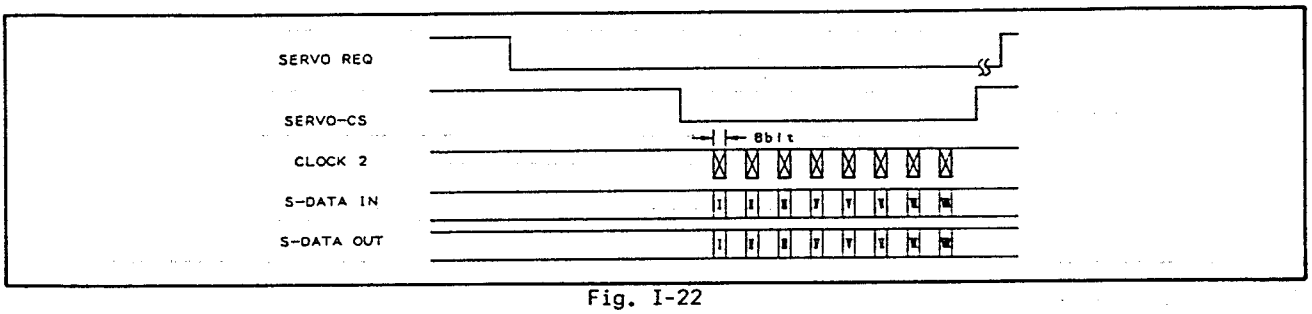


Fig. I-22

(2) Between main microcomputer and camera microcomputer

The data communication between the main microcomputer and camera microcomputer (IC1406) is performed bi-directionally with 8 bits x 8 words. Transmission and reception of mode, operation command, data reading and writing of E^2PROM are conducted in the camera microcomputer. (1 communication every 2 V.)

1) The camera microcomputer lowers to "L" the CAMERA REQ signal of pin 47 to deliver a communication request to the main microcomputer.

Then, the main microcomputer lowers to "L" the CAMERA-CS of in 1 to connect the communication line. A serial communication starts.

2) After end of data transmission and reception, the camera microcomputer raises THE CAMERA REQ signal to "H" and the main microcomputer raises CAMERA-CS to "H" to terminate the communication.

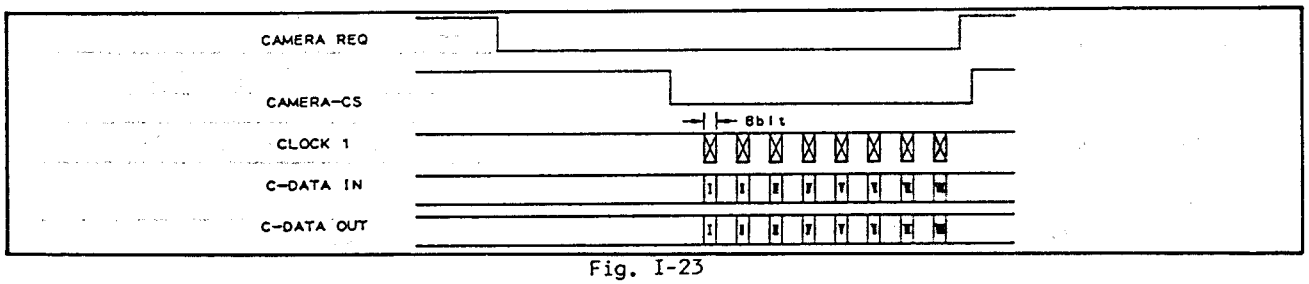


Fig. I-23

(3) Main microcomputer quartz data

The data communication between the main microcomputer and quartz date (IC2003) is performed bi-directionally with 8 bits and 1 words. After the communication with the servo microcomputer, camera microcomputer and DM controller, the main microcomptuer uses the remaining period as a communication period with the character generator and quartz data alternately.

* The main microcomputer lowers QD-CS at pin 76 to "L", during which time the data (tape counter, auto date, etc.) is transferred with the quartz date.

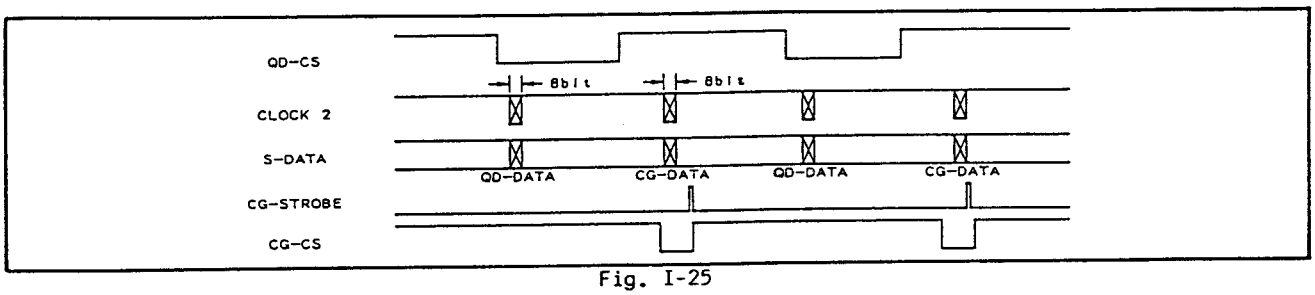


Fig. I-25

(5) Between main microcomputer and character generator

Between the main microcomputer and character generator (IC2002), the communication is unidirectional with 8 bits and 1 word. The period is 1 V and , in the remaining time a communication is performed alternately with the quartz date and character generator. Character data to be indicated on EVF and screen is sent to the character generator.

° After outputting a character generator data from pin 38, the main microcomputer outputs CG-STROBE (CG-CS) from pin 80 to notify that is a character generator data.

(6) Between servo microcomputer and video signal processing IC

Between the servo microcomputer and video signal processing IC (IC101, IC104), the communication is unidirectional with 24 bits. Data of operation modes (REC, PB, etc.) is sent.

° The servo microcomputer outputs VIDEO-CS from pin 65 and, while it is "L", the data is sent to the video signal processing IC.

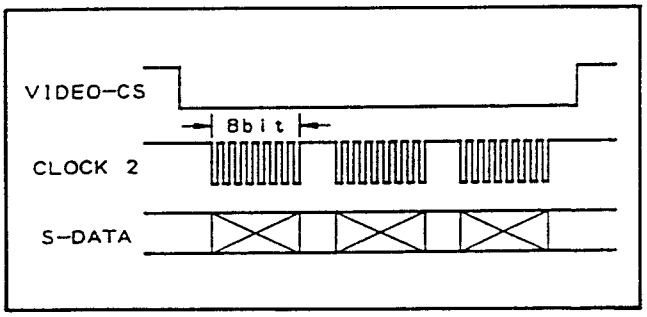


Fig. I-26

(7) Main microcomputer communication priority

Fig. I-27 shows timing of CS (chip select) signal of each communication output from the main microcomputer.

The communication is performed with the servo microcomputer (every V) and camera microcomputer (every 2 V) in this order. Then a communication intervenes with the quartz date (every V) and character generator (every V). As for these 2 communications, if there are many data, the periodic communication above takes a precedence and the remaining communication is carried over to the next V.

When turning on, the communication occurs with the quartz date, camera microcomputer, servo microcomputer and character generator in this order.

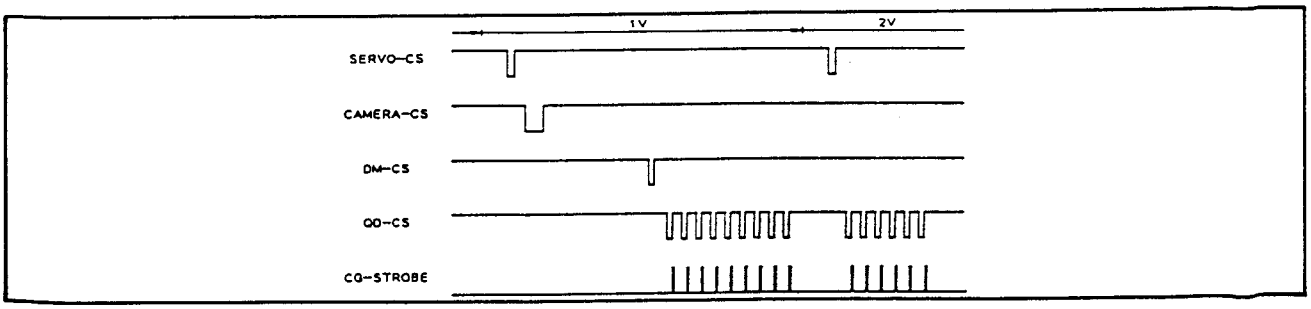


Fig. I-27

4-2-6 Safety features

To avoid machine destruction, tape jamming, etc. attributable to anomalies of instrument, there are alarm display, key acceptance limit, operation limit and other safety features.

(1) Under-voltage detection

Under-voltage of main battery and lithium battery is detected by distinct circuits.

• Main battery

The operation when detecting under-voltage of main battery is divided into 3 steps according to the voltage.

(UNDER CUT 1)
When the battery terminal voltage is 5.67 V or lower, the power indicator LED blinks and "BATT" flashes in EVF to notify the battery voltage is too low.
In this mode, neither input keys nor operations are limited and the operation remains normal except that, once stopped, only the power SW or eject SW is operable.

(UNDER CUT 2)
If the battery voltage further drops below 5.45 V, the power is turned off via STOP mode.

(SHUT OFF)
If the battery voltage has abruptly changed and if EVER 5V drops below 4.5 V, RESET Ⓛ signal is output from pin 1 of IC403, resets the main and servo microcomputers and immediately turns off power.

° Detector circuit
A voltage resistively divided from UNREG 6V of the battery is detected at pin 45 of servo microcomputer. The voltage at pin 45 when the battery terminal is 5.67 V is stored in E^2PROM of camera microcomputer and is sent to the servo microcomputer by a serial data communication. The servo microcomputer compares that value with the input to pin 45 to judge whether the status is UNDER CUT 1 or 2. Thereafter, transmits an under-voltage status to the main microcomputer via a serial data.

Note that UNDER CUT 1 or 2 is detected only when the status lasts 2 seconds or more.

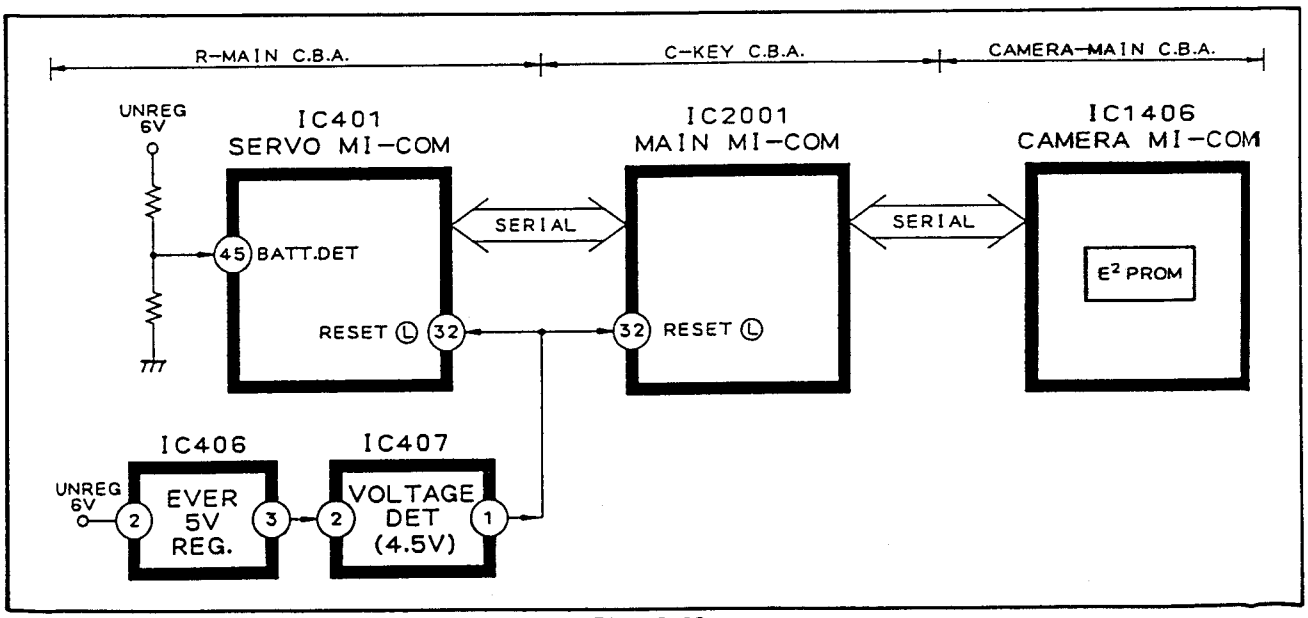


Fig. I-28

• Lithium battery

When the lithium battery terminal voltage drops below approximately 2.5 V, "DATE" blinks in EVF.

On C-KEY circuit board IC2004, if the voltage at pin 2 is below 2.1 V, pin 1 goes "L". The main microcomputer detects that "L" via pin 55 and sends a data so as to blink "DATE" to the character generator.

(Because a diode intervenes, the detection occurs at approximately 2.5 V in terms of lithium battery voltage.)

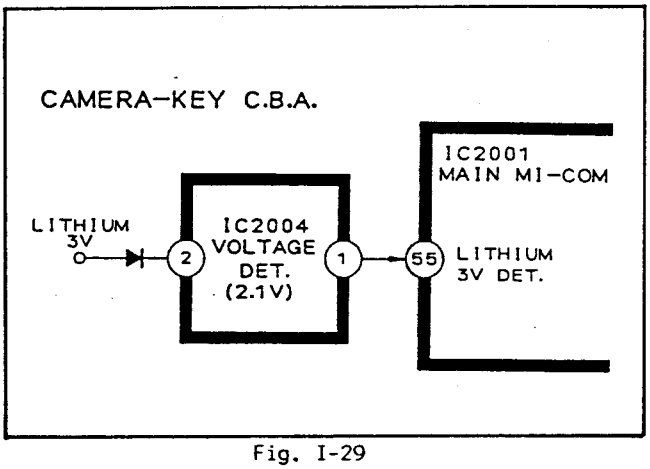


Fig. I-29

(2) Dew condensation

The dew (moisture condensation) detecting function is provided to circumvent jamming of tape due to possible sticking.

If moisture condensation is detected during operation, the mechanism performs the 'DEW EJECT' sequence to take the unload/cassette-in state. Under this condition, only the POWER and EJECT switches are effective. Even after clearing the dew condition, other keys are not accepted unless the power is turned off or the cassette is ejected. Also, even if the cassette is inserted under the dew condition, the loading sequence is not carried out.

For warning of the dew condition, the POWER LED indicator flashes and also 'DEW' and 'EJECT' blink on the viewfinder screen.

Under the dew condition, the dew sensor equipped on the recorder mechanical chassis increases its resistance to increase the DEW detection voltage input to pin 44 of the servo microcomputer. If the level of this voltage rises above the predetermined value, the microcomputer judges that dew condensation has occurred. Then, the microcomputer carries out the mode transition and provides warning indication.

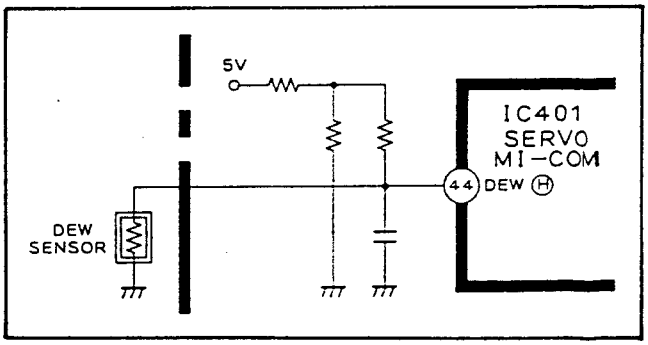


Fig. I-30

(DEW EJECT)

If the videotape sticks to the drum, it cannot be run only with the takeup reel. In this event, the supply reel must be used also. Upon detection of dew condensation, the 'DEW EJECT' sequence is carried out as indicated in Fig. I-31.

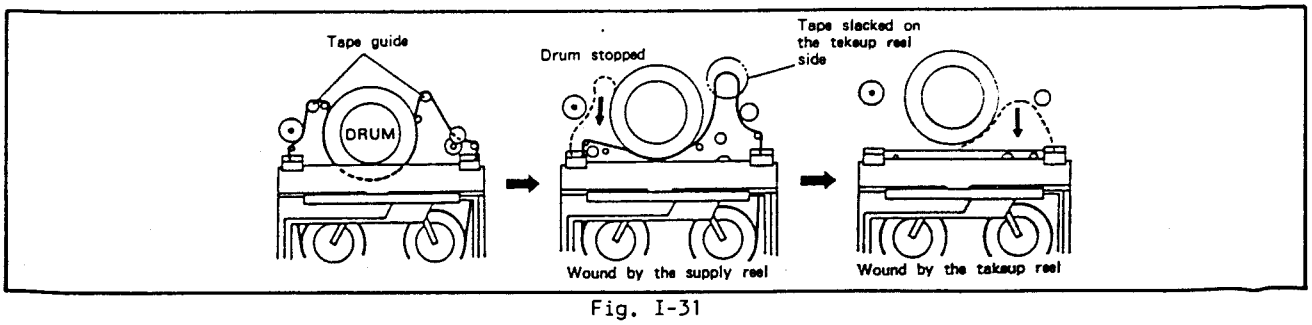


Fig. I-31

(3) End-of-tape check

If the videotape is run up to its end, the tape guide may be damaged or the head drum may be squeezed with the tape. To prevent such an event, the end-of-tape check is conducted to detect the end of tape during operation. Upon detection of the end of tape, the tape is stopped immediately.

The end-of-tape detecting LED is turned on/off with the signal appearing at pin 27 of the SERVO microcomputer (IC401). It constantly flashes in a cycle of one msec. If the signal across pin 57 (55) goes 'Low' twice in succession, the microcomputer recognizes the end (top) of tape to stop the mechanism.

Also, if the EOT and BOT input signals go 'Low' twice in succession, the microcomputer judges that the cassette is not loaded. In this case, 'TAPE' blinks on the viewfinder screen.

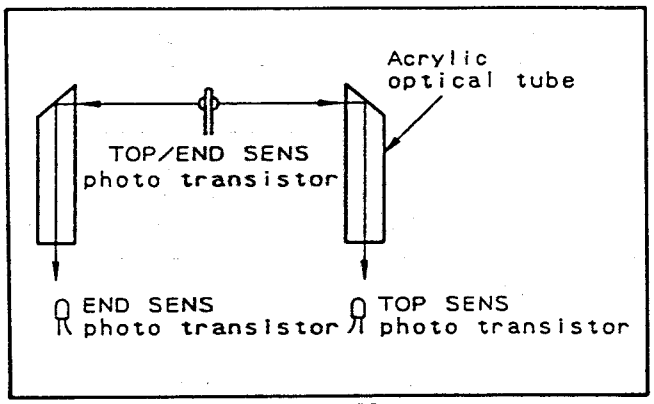


Fig. I-32

(4) Pause timer

In the REC PAUSE or STILL Mode, the head drum rotates with the tape wound around it. If this condition persists for a certain period of time, the tape may wear or the head may be contaminated with magnetic oxides. To prevent this, if the REC PAUSE state is kept for seven minutes, it is automatically changed over to the STOP mode and the power is turned off. Also, if the STILL mode is kept for seven minutes, it is automatically changed over to the STOP mode with the power being turned on.

(5) Trouble stop (error)

Upon detection of an error, the SERVO microcomputer (IC401) puts the mechanism in the stop state. In this state, only the POWER and EJECT keys are usable. The error condition can then be reset. In the event of trouble, the POWER LED indicator flashes and 'EJECT' blinks on the viewfinder screen for warning.

Note that a capstan error is not detected since it can be found out in the reel error detection sequence.

Table I-11

Event	State	Detection
Drum error (During normal operation)	An error is issued if the drum speed decreases below approx. 50% of the normal rotation level. (For approx. 2 seconds)	Pin 61 of IC401; D-FG
Drum error (At startup)	An error is issued if the drum speed decreases below approx. 50% of the normal rotation level in two seconds after output of the DRUM PWM signal.	Pin 61 of IC401; D-FG
Reel error	An error is issued if the reel does not rotate normally. (For more than 9 seconds in the PLAY mode; For 9 sec./each speed (X) in other state)	Pins 46 and 47 of IC401 In forward drive: T-REEL FG In reverse drive: S-REEL FG
Loading motor safety timer	An error is issued if the MODE switch remains intact for the predetermined period of time. (Mode transition operation: 3 seconds Load/unload operation : 8 seconds)	Timer in IC401; MODE switch input for pins 19 to 21

(6) Full-top loading

To prevent the beginning of tape from getting onto the drum edge in loading, the following special sequence is performed upon detection of the beginning of tape after the cassette is inserted.

The takeup reel tenses the tape first, and then the drum motor is run inreverse slightly for approx. one second. this causes the claw on the upper drum to push the tape away to the edge of drum. And, reverse braking is applied to the drum motor to wind the tape on the takeup reel again. Thereafter, the normal loading sequence is carried out.

4-2-7 Servo circuit

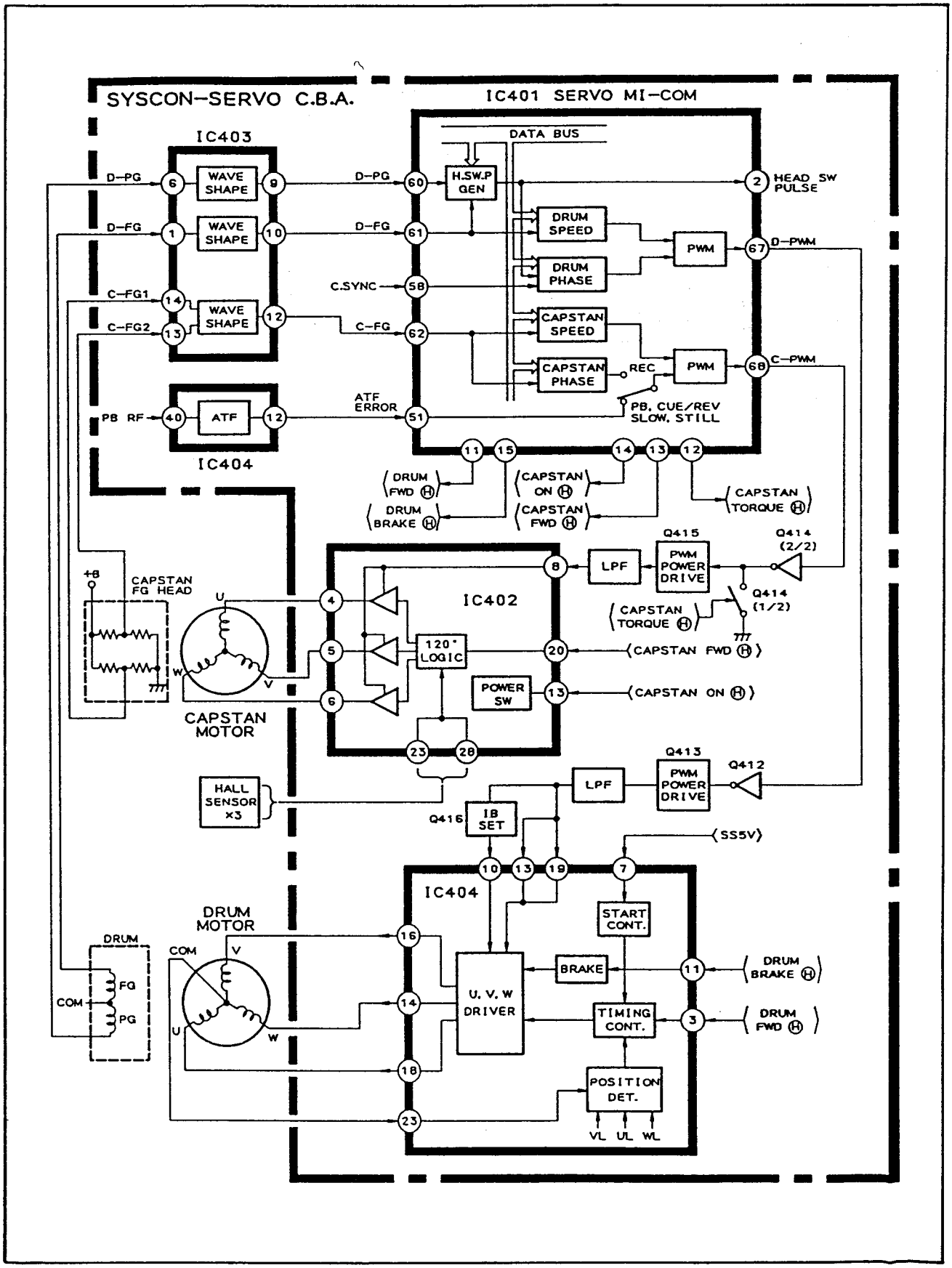


Fig. I-33

Drum and capstan servo is performed in the servo microcomputer (IC401) on the R-MAIN C.B.A. The microcomputer is provided inside with a servo system hardware to carry out software servo.

(1) Drum servo

Rotates the drum motor at a constant speed synchronized with synchronizing signal input to pin 58 when recording or with the servo microcomputer internal counter when playing back.

The trace signals FG and PG from the drum motor are shaped by IC403 and enters servo microcomputer pins 60 and 61. The D-FG is normally 720 Hz and is used for speed servo by a comparison with internal reference signal. As for D-PG, 2 pulses output per drum turn. It is used for phase servo with comparison with internal reference.

The servo microcomputer superposes a speed servo and phase servo error on D-PWM signal and outputs it via pin 67. The signal output from pin 67 passes through PWM drive circuit and LPF, becomes a DC voltage, is applied to IC404 pins 13 and 19 and controls the drum. The signal inputted to IC404 pin 10 corrects variations of drive voltage (pins 13, 14) level in the circuit of reducing electromagnetic noise generated by the drum motor.

3 phases motor changeover is performed when counter-emf generated from coils is detected.

The motor is started by aforementioned D-PWM signal. If, at that time, the drum motor is judged not rotating, the turning direction is changed forward or reversely to start it and, if it does not start still, an error occurs.

The turning direction is controlled by DRUM FWD Ⓗ signal output from servo microcomputer pin 11 and the brake when stopping is controlled by DRUM BRAKE Ⓗ output from pin 15.

(2) Capstan servo

The FG1 from the capstan motor and FG2 in opposite phase are shaped by IC403, are doubled and, as logical levels, are applied to the servo microcomputer. The frequency is 948 Hz at REC. Based on this signal, the servo microcomputer performs speed servo and phase servo. At a playback, a phase servo is applied by ATF ERROR signal input to pin 51. The result is output as C-PWM from pin 68 the same as the drum servo, passes through power drive at 415 and LPF, is applied to pin 8 of CAPSTAN MOTOR DRIVE (IC402) as a DC voltage and becomes a drive voltage for each phase of U, V and W of motor.

Switching of U, V and W of motor is controlled by detecting the rotor position with 3 Hall generators.

Motor starting is controlled by the CAPSTAN ON Ⓗ signal from MAIN MI-COM. When applying reverse turn braking when beginning or end of tape is detected, for example, CPASTAN TORQUE Ⓗ is output from SERVO MI-COM, Q414 (1/2) turns on, the drive voltage is maximized and CAPSTAN FWD Ⓗ goes "L".

4-2-8 Audio and video circuit

The video and audio circuit has the same configuration as conventional normal band, monaural audio set. Here, the outline and new sections are described.

(1) Audio circuit

All audio signal processing before the head amplifier input is performed on AV C.B.A. It is the same as the conventional monaural audio circuit.

(2) Video circuit

The video signal is processed on the R-MAIN C.B.A.
(The operation of each circuit for processing is the same as that of the model E30E,F, etc.)

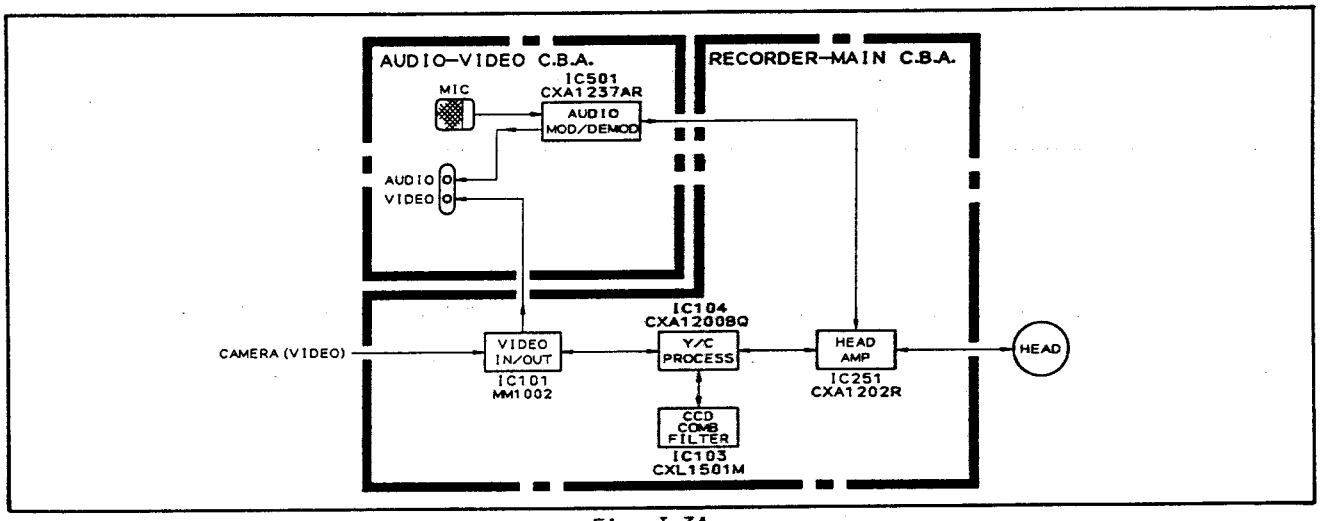


Fig. I-34

4-2-9 Battery light control circuit

The GRIP C.B.A. is povided on its top with a drive circuit for the battery light to be connected to the accessory shoe terminal.

° Light ON control
The battery light can be lit only when the battery is used in REC or REC PAUSE mode. The ON permit signal at REC or REC PAUSE is the LIGHT CONT signal sent from the main microcomputer. When the signal is "H", the ON is permitted. The grip section is provided with a battery detection SW (SW2941, 2942) so LIGHT CONT signal will not be applied to the battery drive circuit when the battery is not installed.
The battery light turns on when the battery light SW is turned on and when "L" (which is inverted from LIGHT CONT "H") is applied to the base of Q2943.

° Outline of control circuit

The resistance of battery light is 0 Ω immediately after turning on and then increases to 6 Ω thereafter. If a voltage is applied simply, an excessive current would flow at the first stage of turning on, affect the main unit and shorten the life of battery light.

To avoid such inconvenience, IC2941 (1/2) detects a voltage across the battery light terminal and IC2941 (2/2) for controlling the FET to limit the current flowing through the battery light.

° Control circuit operation

Immediately after turning on power, the resistance of battery light is low and the voltage at pin 2 of CN2905 LIGHT (-) is high. IC2941 (1/2) inverts and amplifies that voltage according to a reference voltage (pin 3 input) obtained by resistively dividing power voltage. The inverted and boosted signal is divided by resistors and is input to pin 5 of IC2941. In this case, the voltage applied to pin 5 lowers. Therefore, the pin 7 output lowers the gate voltage of FET (Q2942) to reduce the current flowing through the battery.

When the battery light resistance turns high enough, the FET turns on completely and a current corresponding to the power voltage flows to the battery light.

The Q2944 is provided on the rear of FET to detect a temperature rise of FET.

As the temperature rises, the current flowing through Q2944 increases, the voltage at pin 5 of IC2951 lowers, the FET gate voltage drops and, accordingly, the current through the FET reduces.

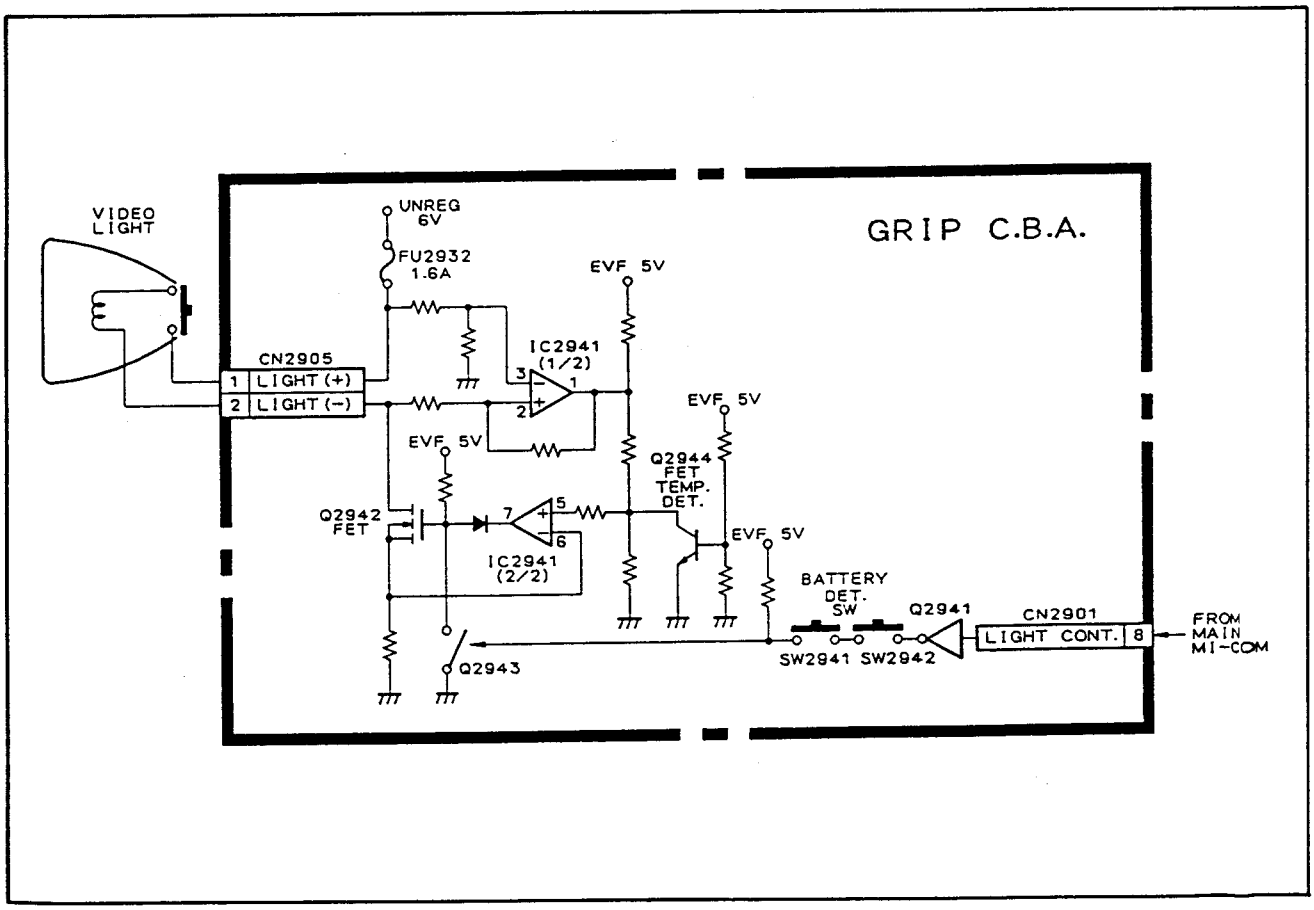


Fig. I-35

CONTENTS

CHAPTER II. DISASSEMBLING/ADJUSTMENTS

CHAPTER II. DISASSEMBLING/ADJUSTMENTS

1. Before Disassembling/Adjustments

1-1 List of maintenance tools and supplies

1-1-1 Maintenance tools

DESCRIPTION	TOOL NO.	REMARKS
Alignment tape E (Monosco)	DY9-1062-000	
Recording current checker	DY9-1056-000	
Extension cable kit (A1)	DY9-1089-100	
Extension cable kit	DY9-1117-000	New (DY9-1118, 1119 included)
INPUT cable	DY9-1121-000	New
Y/C SEPARATOR	DY9-1093-500	
Color bar chart	DY9-2002-000	
Registration chart	DY9-2005-000	
Adjuster (2.6 mm)	DY9-2021-000	
Phillips screwdriver (bit part only)	DY9-2030-000	
Adjuster (1.8 mm)	DY9-2041-000	
Color chart viewer (5600°K)	DY9-2039-100-115	
Viewer amplifier (5600°K)	DY9-2040-000	
ND-2.0 filter (100 x 100 mm)	DY9-2044-000	
CCA12 filter ϕ46	DY9-2046-000	

Supplies

DESCRIPTION	TOOL NO.	REMARKS
Alonalpha	CY9-8007-000	
Screw Lock 1401C	CY9-8011-000	
Grease GE-C9	CY9-8043-000	
Grease GE-X8	CY9-8044-000	
Grease GE-C4	CY9-8045-000	
Teflon Fluorocarbon Resin MP-102	CY9-3013-000	
Floil G902	CY9-3017-000	

* Note: For recorder mechanism, refer to the mechanism manual for MC-4B (DY8-3391-501-201) separately issued.

1-1-2 List of extension cables

Use the following extension cables.

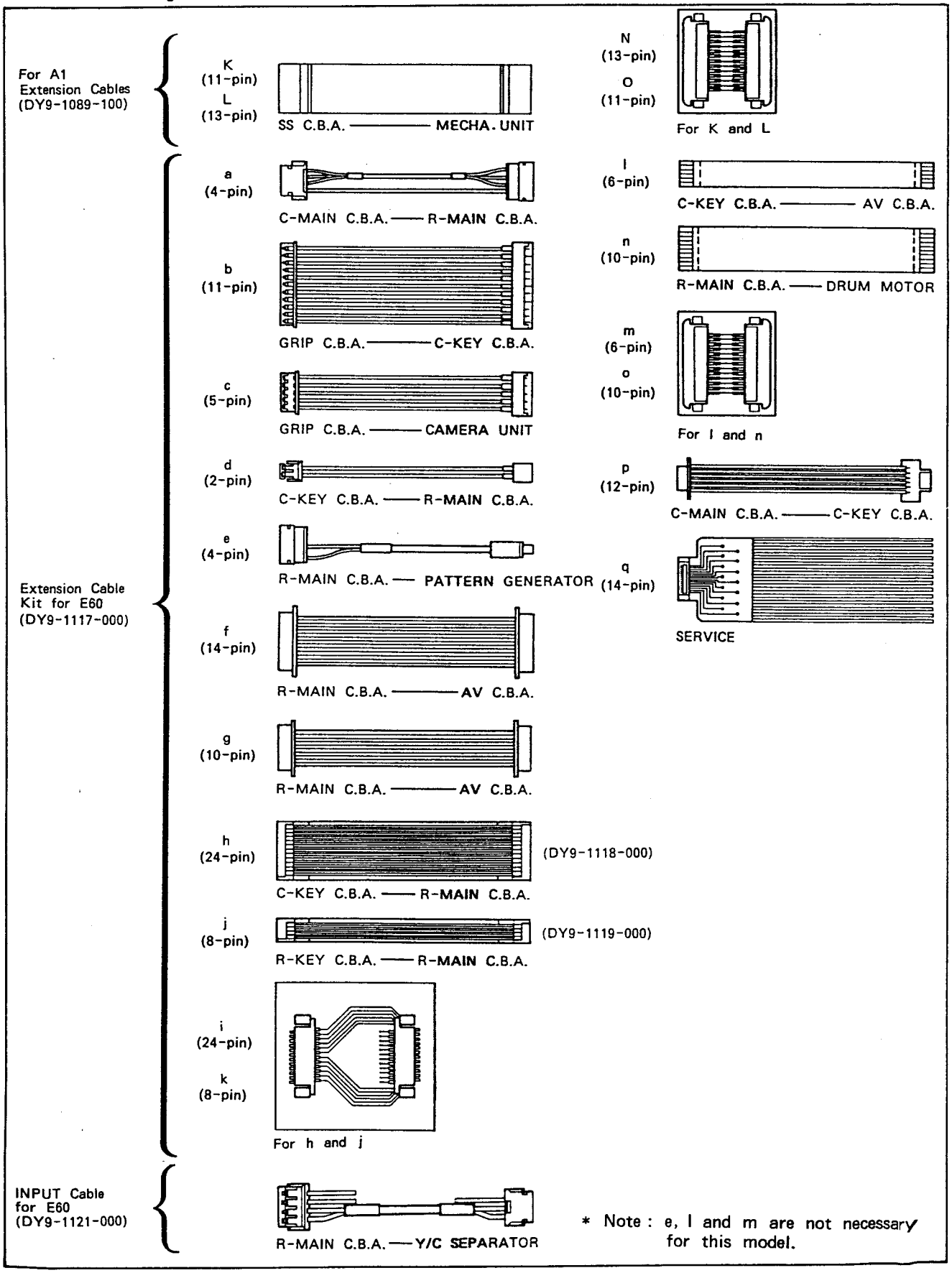


Fig. II-1

2. Disassembling

2-1 Disassembling of covers

2-1-1 Removal of lithium battery

(1) Turn the grip slantwise, and remove the lithium battery in the arrow direction.

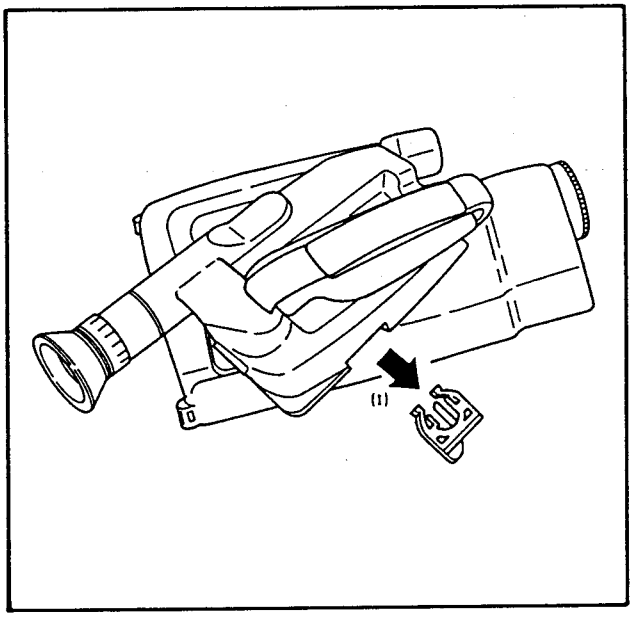


Fig. II-2

2-1-2 Removal of cassette cover

(1) Remove two screw ⓐs.
(2) Remove the cassette cover.

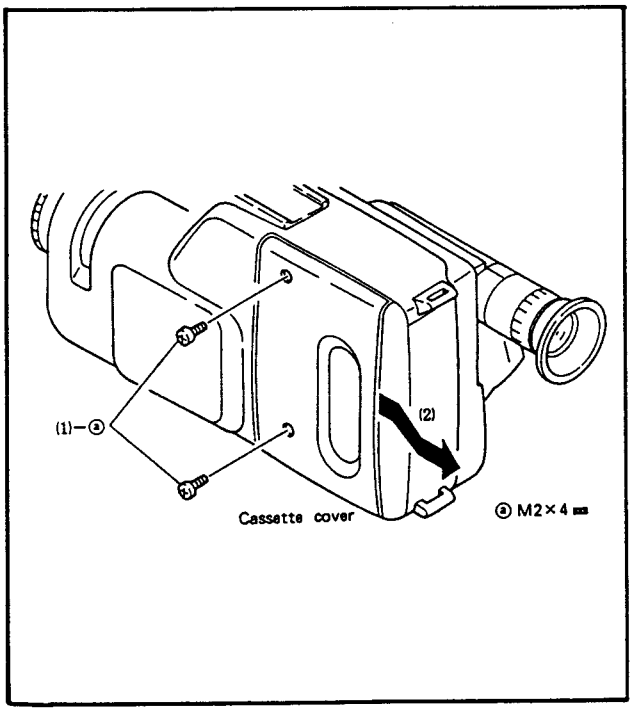


Fig. II-3

2-1-3 Removal of finder, EVF ring, and grip left cover

(1) Remove the finder and the EVF ring.
(2) Remove four screw ⓐs, and remove the grip left cover.

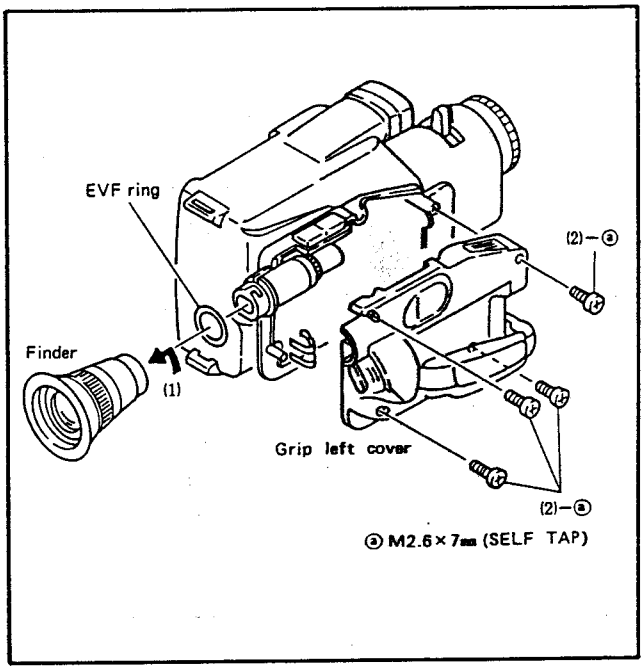


Fig. II-4

2-1-4 Removal of lens hood and lens cover

(1) Remove the lens hood while turning it in the direction of arrow.
(2) Remove the screw ⓐ and two ⓑs.
(3) While pushing the indicated part (arrow-marked), remove the lens cover.

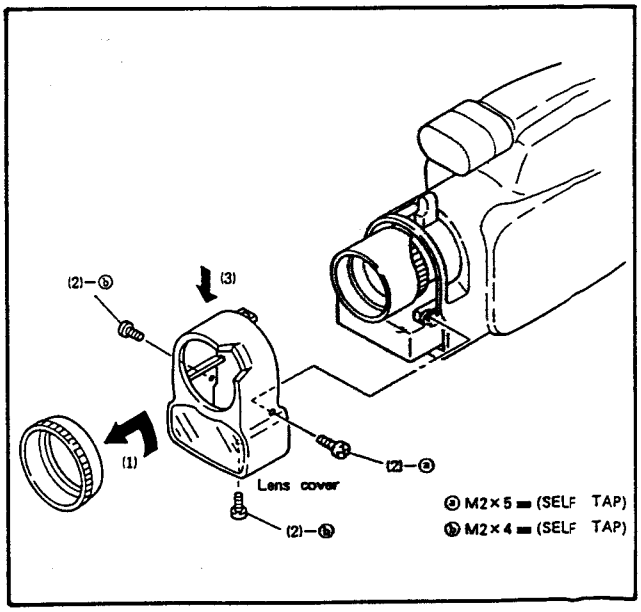


Fig. II-5

2-1-5 Removal of connectors of Grip C.B.A.

(1) Unplug four connectors (CNs 2901, 2902, 2904 and 2905) between the Grip C.B.A. and the main unit.

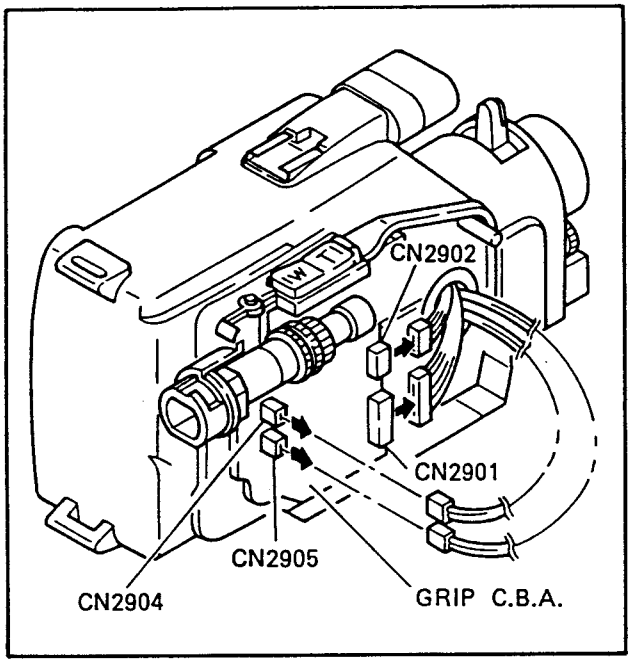


Fig. II-6

2-1-6 Removal of left, right and upper covers (Part I)

(1) Remove three screw ⓐs and two ⓑs.
(2) Remove three screw ⓐs .

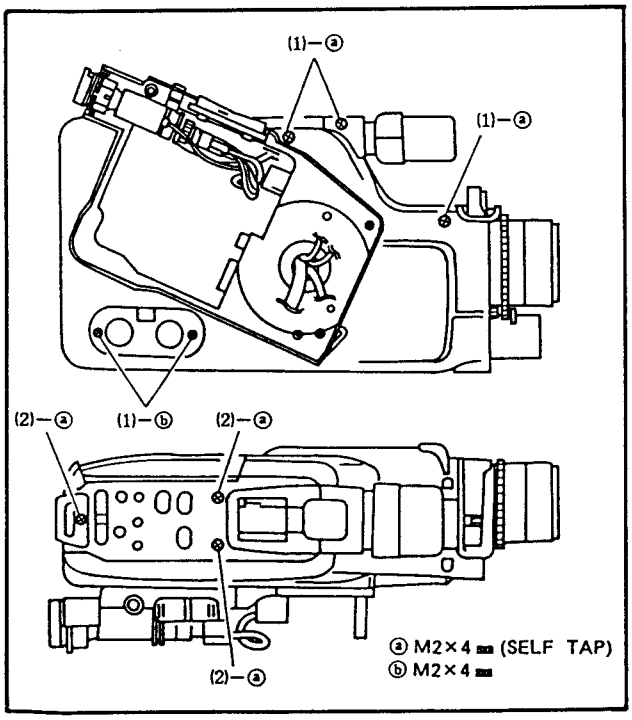


Fig. II-7

2-1-7 Removal of left, right, upper covers and microphone unit (Part II)

(1) Remove three screw ⓐs.
(2) Remove two screw ⓑs.
(3) Remove the screws ⓐ and ⓒ (1 pc. each) and two ⓓs.
(4) Remove the left and right covers. Unplug the CN650, and remove the microphone unit and the upper cover.

* Note: Remove the left cover while taking out the connector through the hole.

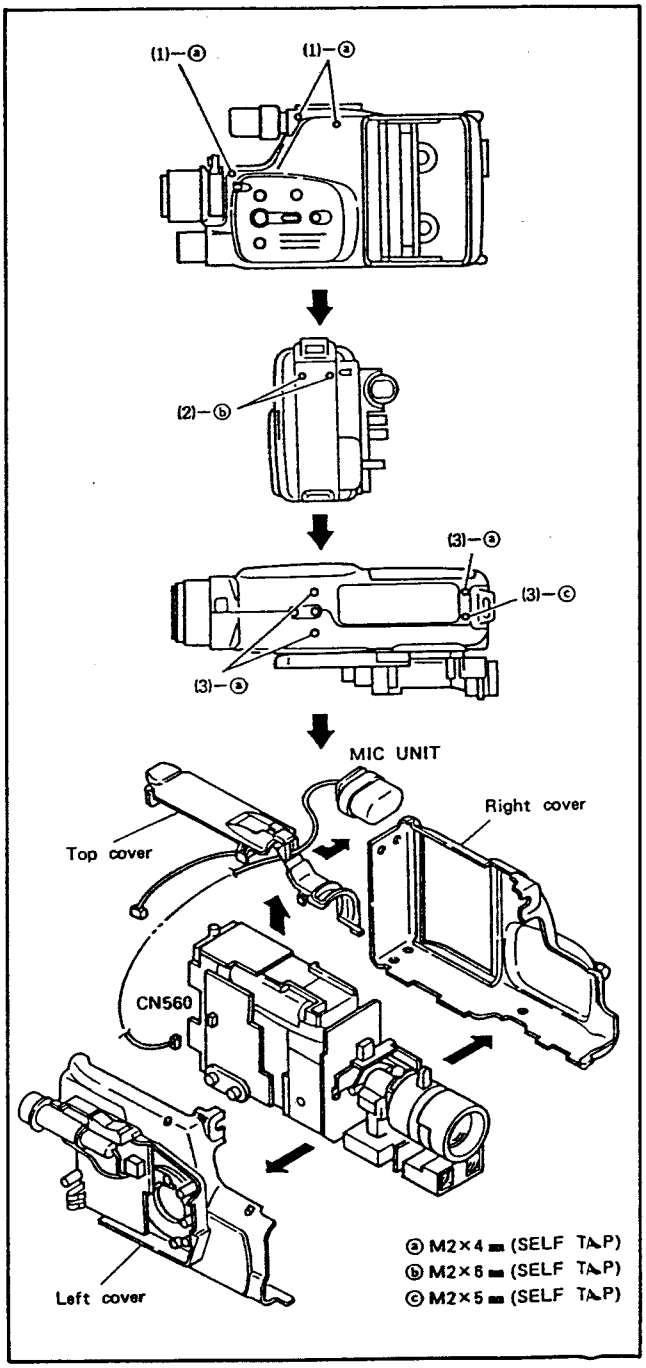


Fig. II-8

2-1-8 Separation of camera and recorder units (Part I)

(1) Remove the screw ⓐ.
(2) Unplug the CN2002.

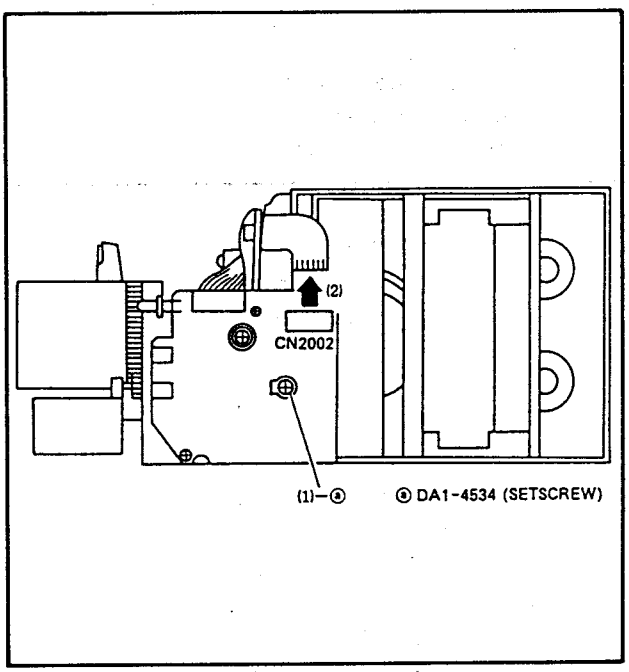


Fig. II-9

2-1-9 Separation of camera and recorder units (Part II)

(1) Unplug the CN410.
(2) Unplug the CN1301.
(3) Separate the camera unit from the recorder unit.

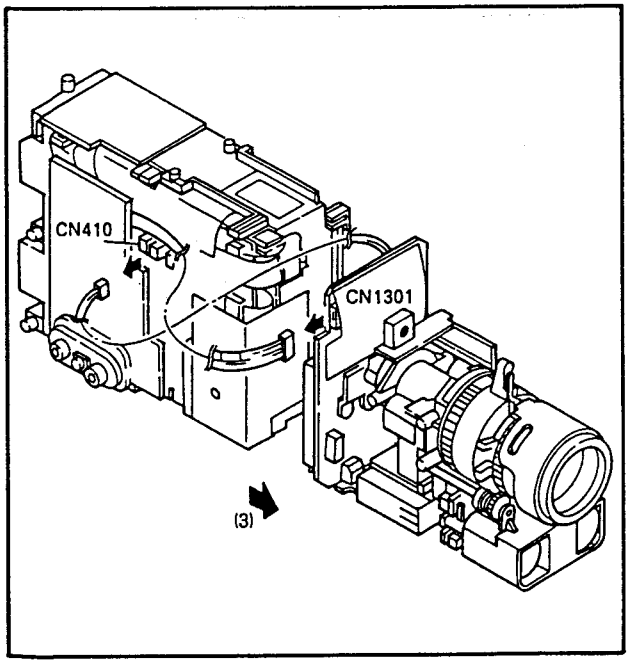


Fig. II-10

2-1-10 Removal of GRIP C.B.A.

(1) Remove the screw ⓐ.
(2) Remove the GRIP C.B.A. by shifting it in the direction of arrow.

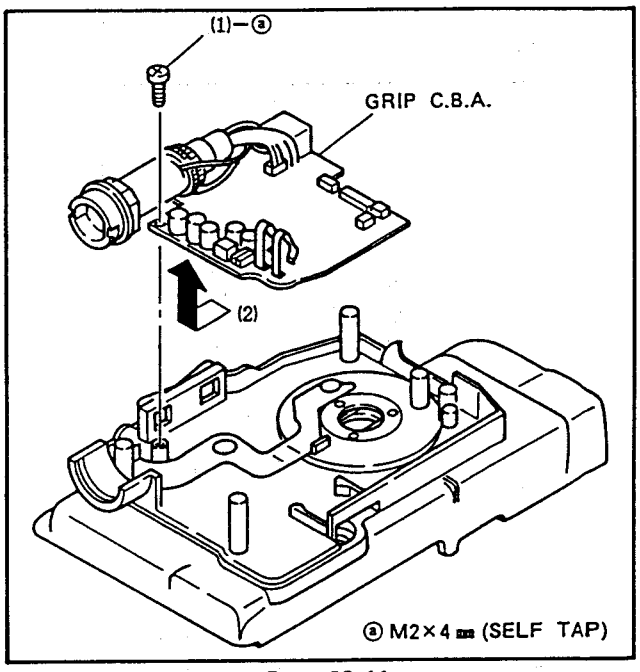


Fig. II-11

2-1-11 Removal of grip right cover

(1) Remove three screws ⓐ.
(2) Remove the grip right cover.

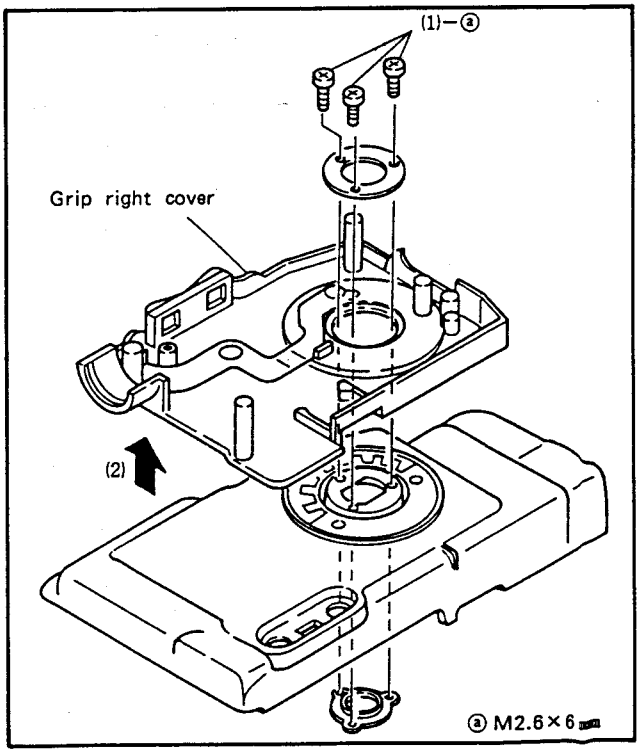


Fig. II-12

2-2 Disassembling of camera section

2-2-1 Removal of REMOCON C.B.A.

(1) Remove the screw ⓐ.
(2) By pulling it upward, remove the REMOCON C.B.A.

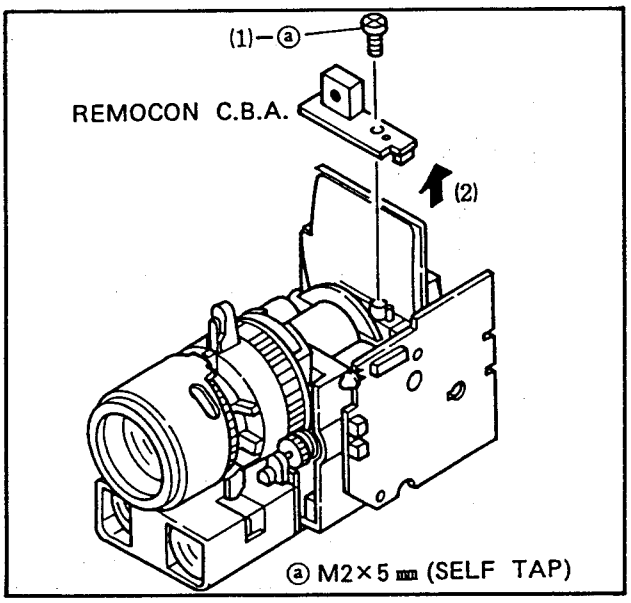


Fig. II-13

2-2-2 Removal of CAMERA-KEY C.B.A.

(1) Remove two screw ⓐs.
(2) Unplug the CNs 2007 and 2008.
(3) Release the Ⓐ and Ⓑ parts.
Then, while pulling it upward, remove the CAMERA-KEY C.B.A.

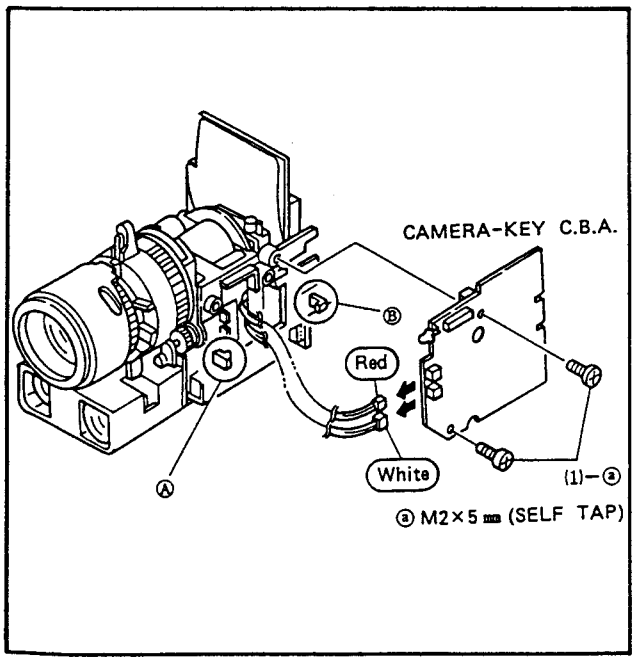


Fig. II-14

2-2-3 Removal of CAMERA-MAIN C.B.A. and DC/DC converter

(1) Remove the shield plate.
(2) Remove the CNs 1, 1002 and 1101.
(3) Unsolder the pins of CCD.
(4) Remove two screw ⓐs.
(5) Remove the CAMERA-MAIN C.B.A. and the DC/DC converter simultaneously by pulling them in the arrow directions.

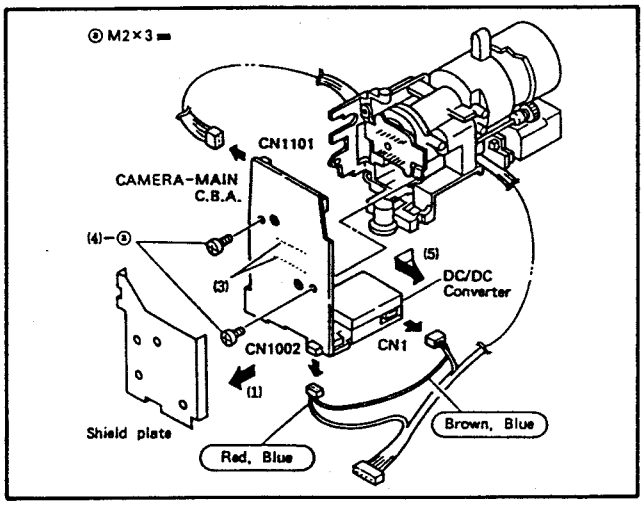


Fig. II-15

2-2-4 Removal camera holders A and B

(1) Remove the screw ⓐ.
(2) Remove five screw ⓐs, and dismount the camera holders A and B.

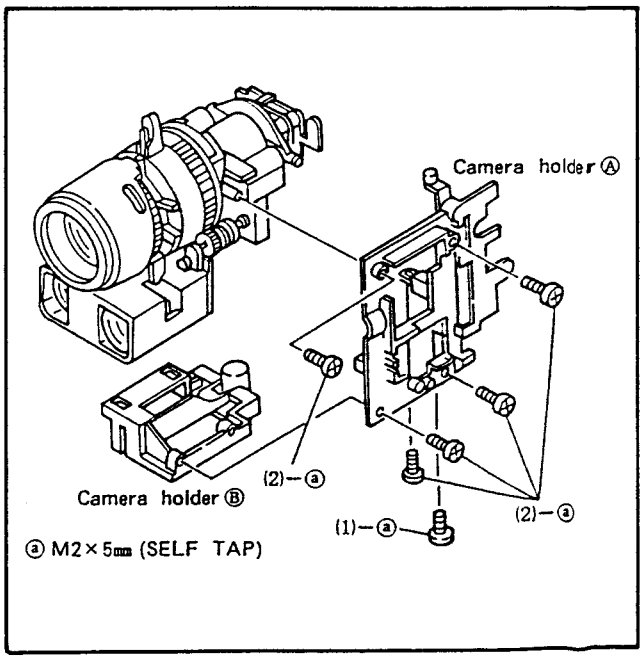


Fig. II-16

2-2-5 Removal of CCD holder

(1) Remove two screw ⓐs, and remove the CCD holder.

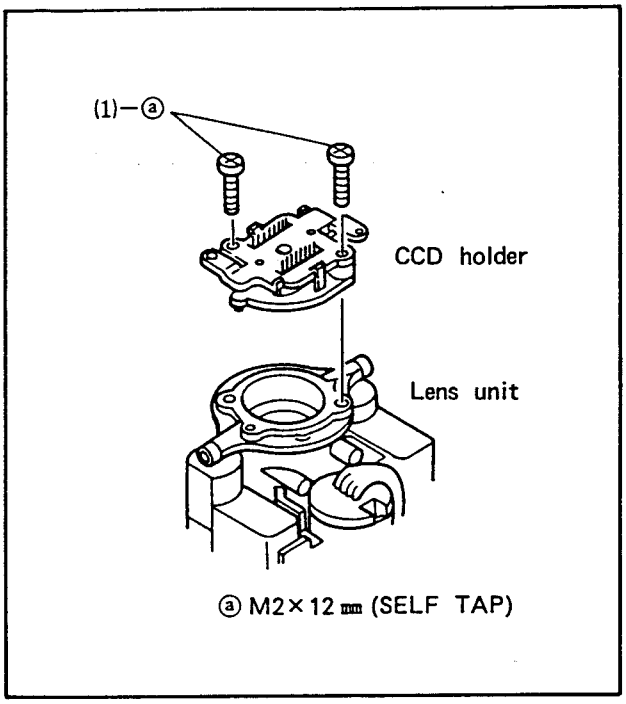


Fig. II-17

2-2-6 Removal of CCD unit

(1) Unclaw two Ⓐs, and remove the CCD unit.
(2) Remove the CCD rubber and the infrared cutting filter.

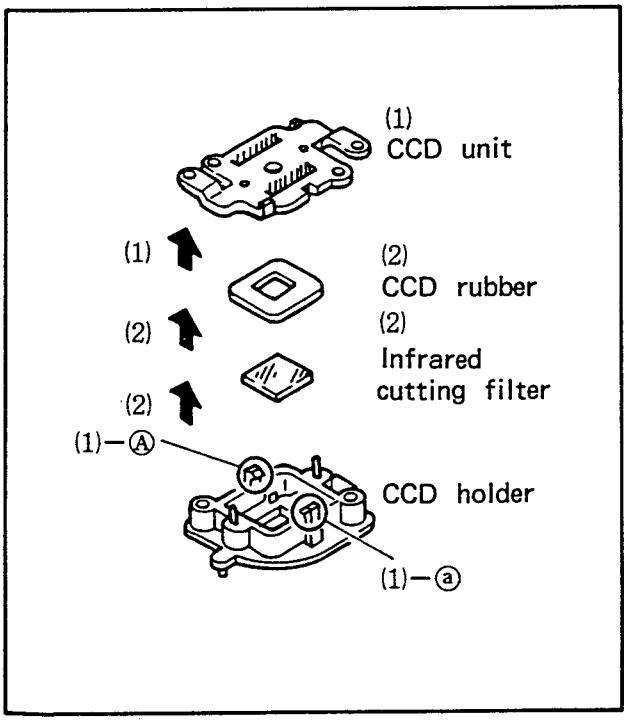


Fig. II-18

2-2-7 Reassembling of CCD section

(1) Install the infrared cutting filter and then the CCD rubber on the CCD holder.
* Note: Remove the dust particles.
(2) Install the CCD unit on the CCD holder.
* Notes: 1. Check the directivity referring to the Fig. II-19.
2. Push the unit until the two hooks (Ⓐ) are completely hooked.
(3) Install the CCD holder on the lens unit, and fix it with two screw ⓐs.
* Note: Check the directivity referring to the Fig. II-19.

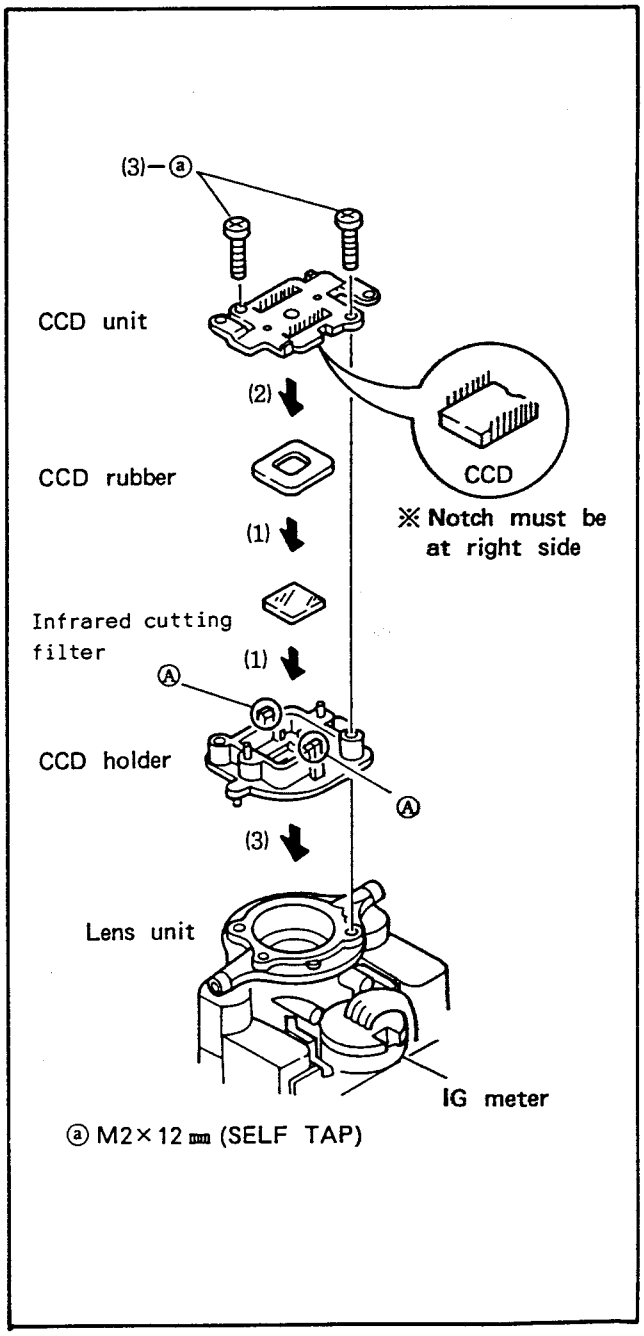


Fig. II-19

2-3 Disassembling of lens section

2-3-1 Removal of AF block

(1) Remove the screw ⓐ and the AF block.

* Notes: 1. Befroe reassembling, check if the lever of parallel prism is not on the distance ring. (Then, secure it with the screw.)
2. After the replacement of AF block, be sure to perform the AF measuring adjustment. (P. II-28)

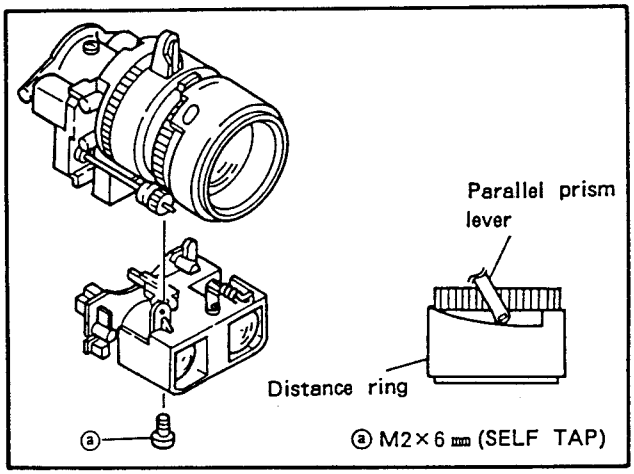


Fig. II-20

2-3-2 Removal of infinity switch

(1) Remove the screw ⓐ, and remove the infinity switch.

* Notes: 1. When reattaching, align the shorter side of switch with the second line of graduation marked on the AF block. (Count the graduation from the left side)
2. Hook the lead wire on the rib of AF block.

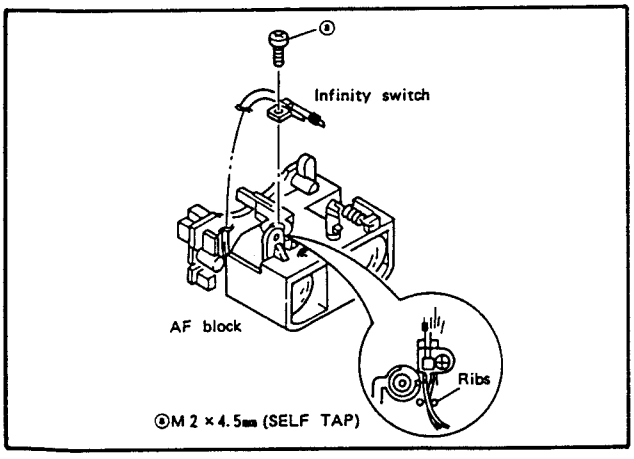


Fig. II-21

2-3-3 Removal of AF motor, PZ motor and IG meter unit

(1) Unhook the Ⓐ, and remove the AF motor while unhooking Ⓑ.
(2) Remove the PZ motor in the same manner as above.
(3) Unhook the Ⓒs, and remove the IG meter unit.

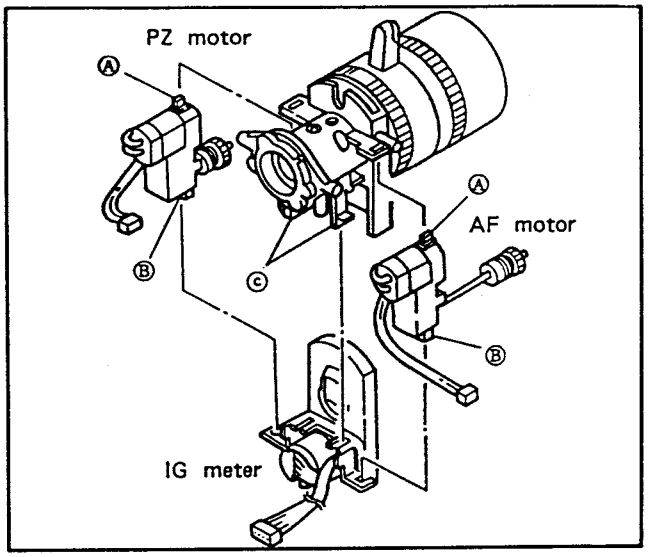


Fig. II-22

2-3-4 Removal of low-pass filter

(1) Remove the low-pass filter by unhooking two Ⓐs.

* Notes: 1. Before reassembling, check the flaw, dust particles, etc. on the low-pass filter. (If there is the dust particles, remove it carefully by using the solvent a little.)
2. When reassembling, check the directivity of low-pass filter.

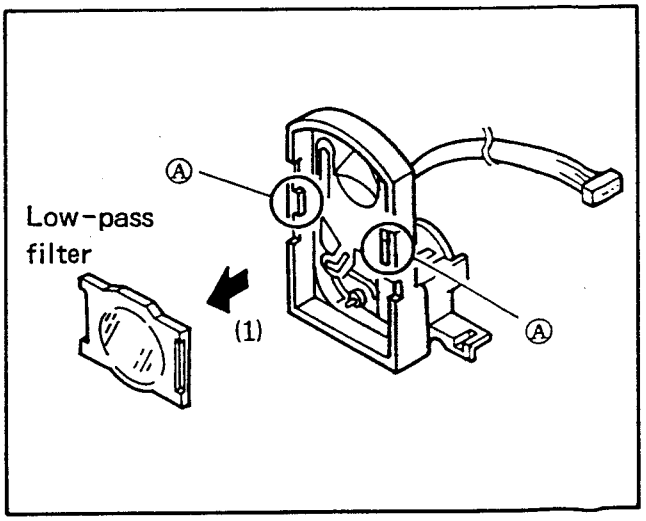


Fig. II-23

2-3-5 Removal of relay lens assembly

(1) Remove the screw ⓐ, and dismount the relay lens assembly.

* Notes: 1. Before reinstalling the relay lens assembly, clean the dust particles, etc. on the assembly.
2. After the reinstallation, be sure to perform the back focus adjustment. (P. II-28)

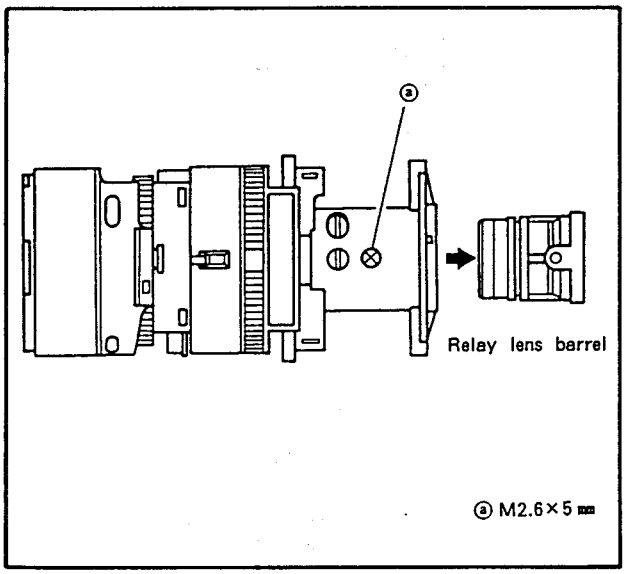


Fig. II-24

2-3-6 Disassembling of zoom section

(1) Remove three screw ⓐs.
(2) While steadying the zoom section, turn the focus lens assembly up.
(3) Set the zoom lever on the position as shown in the Fig. II-25.
(4) While steadying the zoom ring, dismount the focus lens assembly and the fixed lens barrel upward.
(5) Remove the zoom ring.
(6) Remove the cam ring.
(7) Remove the variator and the compensator lenses.
(8) Remove the spring and three guide bars.

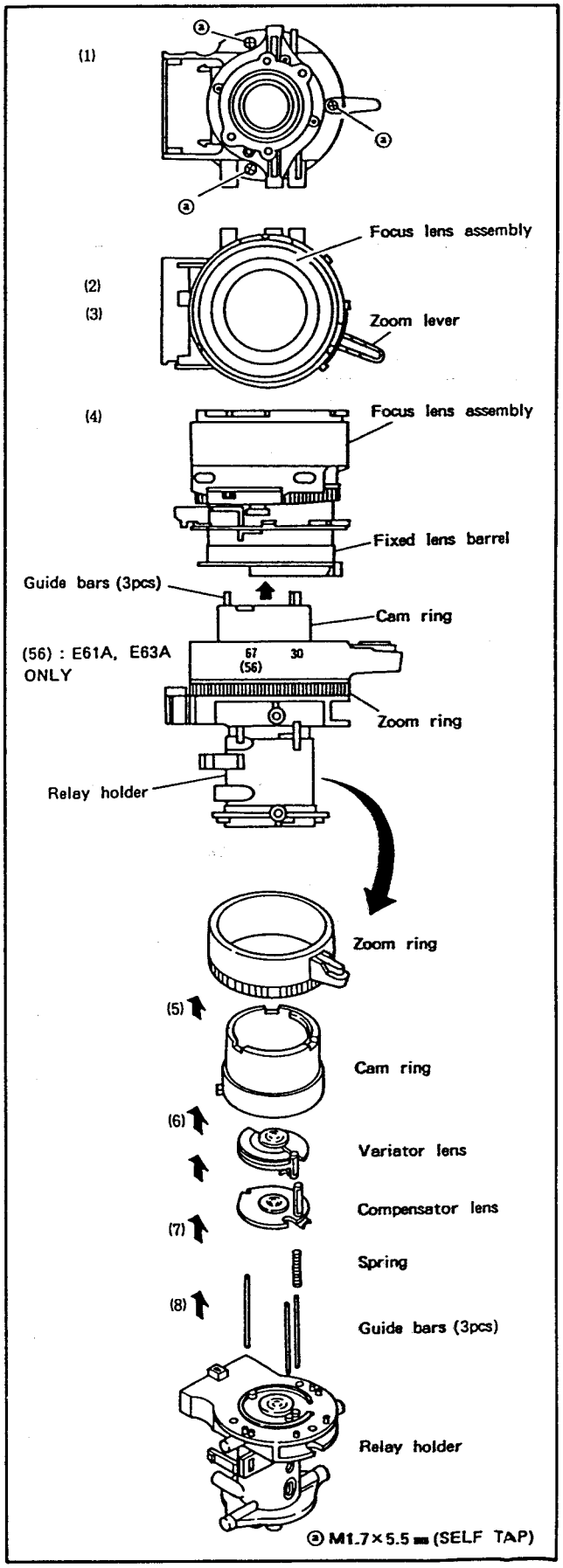


Fig. II-25

2-3-7 Removal of focus lens assembly

(1) Fold the Ⓐ of distance ring.
(2) Remove the focus lens assembly.

* Note: Do not use the removed focus lens assembly again.
(Use the new one.)

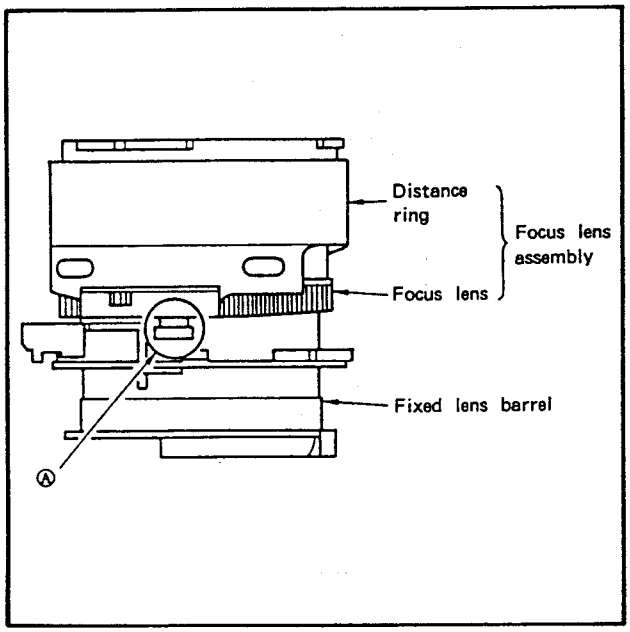


Fig. II-26

2-3-8 Reassembling of focus lens assembly

(1) While aligning Ⓐ and Ⓑ, reassemble the fixed lens barrel and the focus lens.
(2) Turn the focus lens completely to an end, turn it back to the position where the Ⓒ and Ⓓ are aligned.
(3) While aligning Ⓔ and Ⓕ, reassemble the distance ring and the focus lens.

* Notes: 1. If there is the flaw, dust particles, etc. on the lens, clean or replace it.
2. After reassembling, perform the afocal lens adjustment.
(P. II-28)

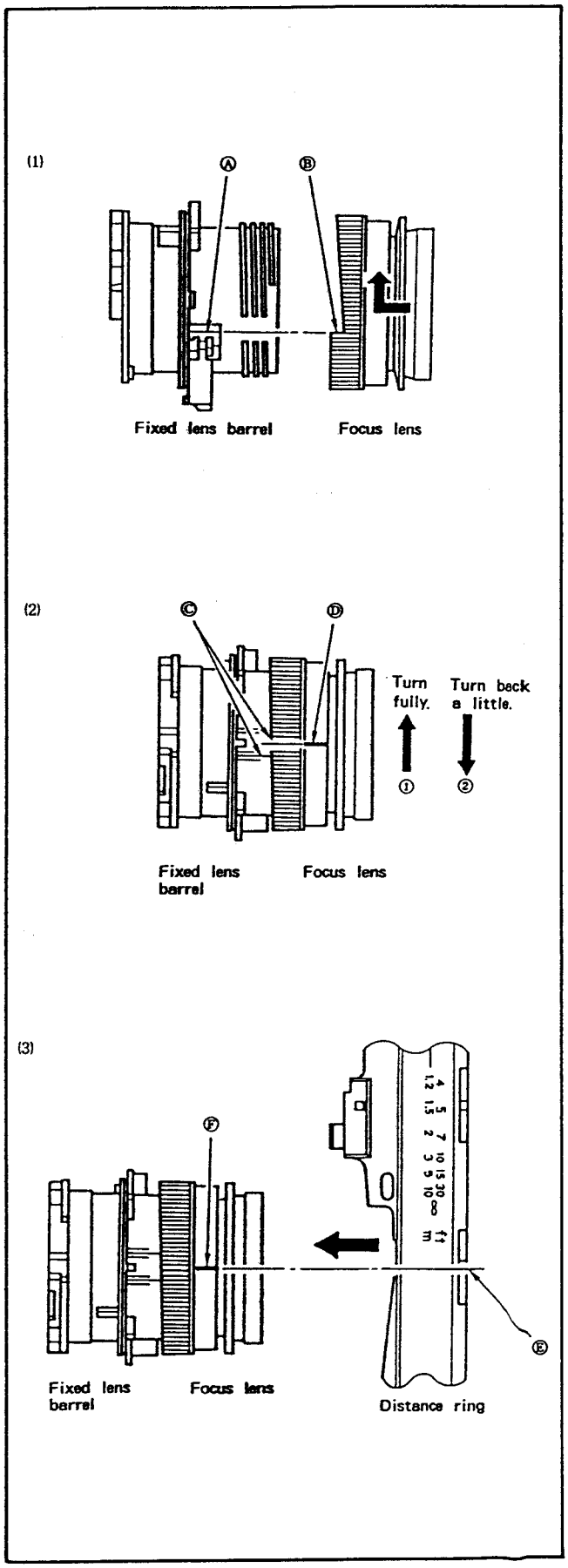


Fig. II-27

2-3-9 Reassembling of zoom section

(1) Install the guide bars (3 pcs.), spring and the compensator lens on the relay holder.

(2) Attach the cam ring.

* Note: Align the convex of cam ring with the position Ⓐ.

(3) Install the variator lens, and turn the cam ring until the convex is aligned with Ⓑ.

* Note: Insert the V cam lift of cam ring into the space between the springs Ⓐ and Ⓒ.

(4) Install the zoom ring.

* Note: Align the both convexes of zoom and the cam rings.

(5) Install the fixed lens barrel and the focus lens assembly.

(6) Secure three screw ⓐs.

* Notes: 1. If there is the flaw, dust particles, etc. on the lens, clean or replace it.
2. By moving the zoom lever, check the operation.

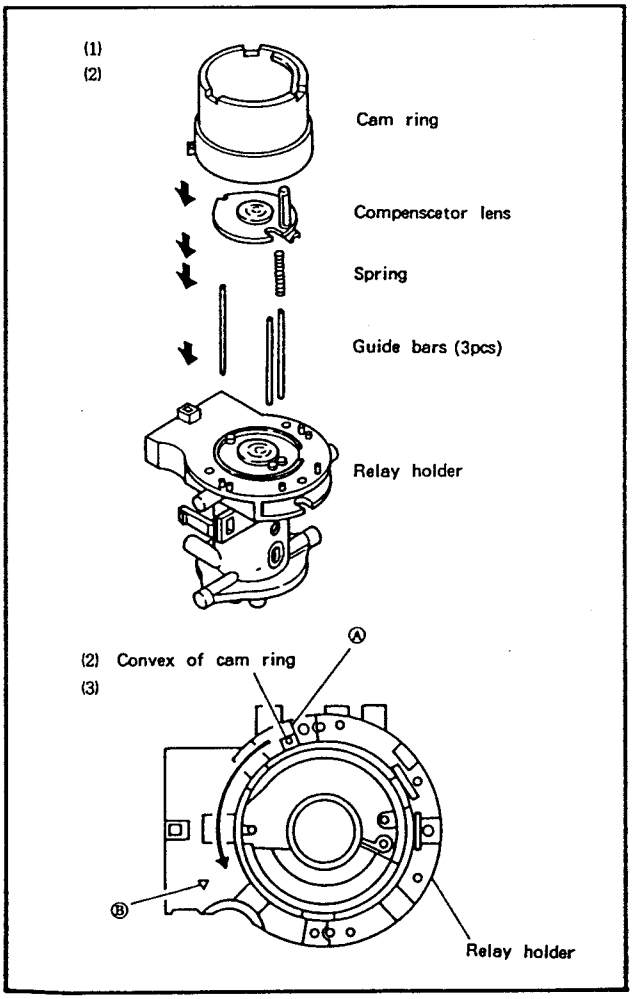


Fig. II-28

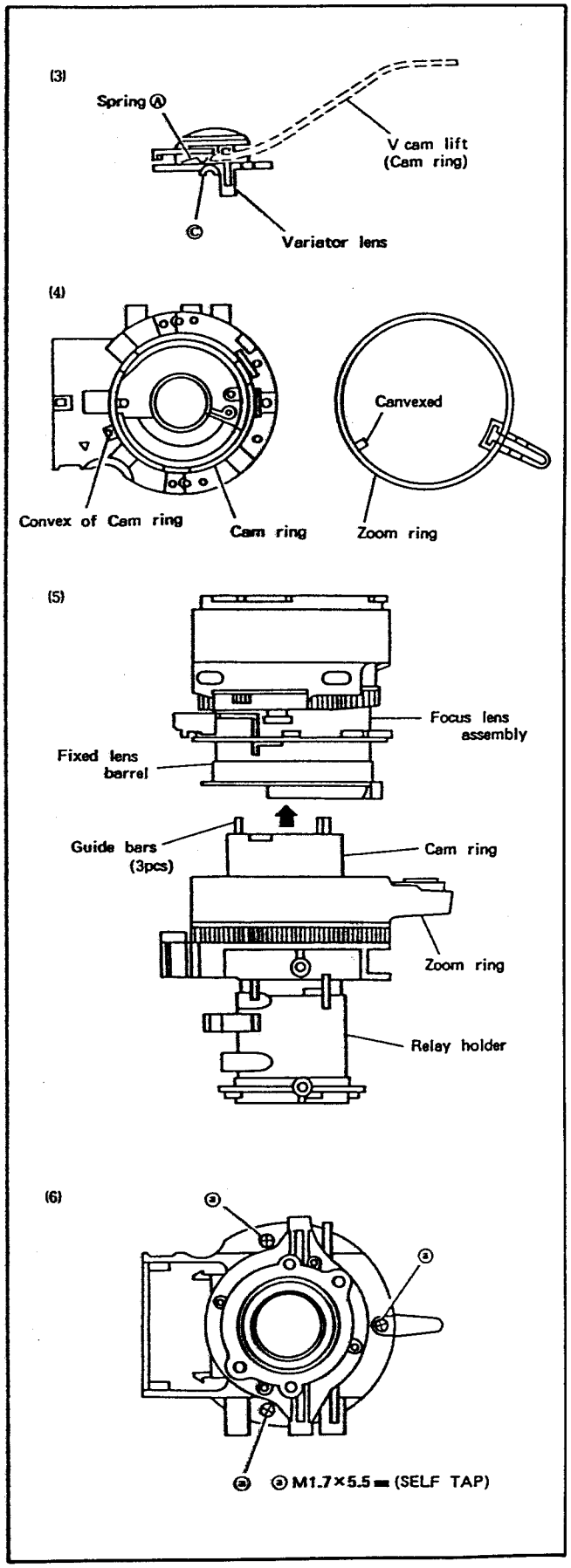


Fig. II-29

2-3-10 Application positions of oil, grease and adhesive

After the replacement, cleaning, etc., apply the followings adhesives on the positions indicated below. (The No. in the Fig. II-30 indicate the kinds of adhesive.)

① Mix the GE-X8 (CY9-8044-000) and the GE-C9 (CY9-8043-000)
* Mix ratio (weight): 1:1

② GE-X8 (CY9-8044-000)

③ Mix the GE-C4 (CY9-8045-000) and the Teflon Fluorocarbon Resin MP-102 (DY9-3013-000).
* Mix ratio (weight)

GE-C4	:	MP102
10		5

④ Mix the GE-C4 (CY9-8045-000) and the Teflon Fluorocarbon Resin MP-102 (DY9-3013-000).
* Mix ratio (weight)

GE-C4	:	MP102
10		2

⑤ Alonalpha (CY9-8007-000)

⑥ Floil G902 (CY9-3017-000)

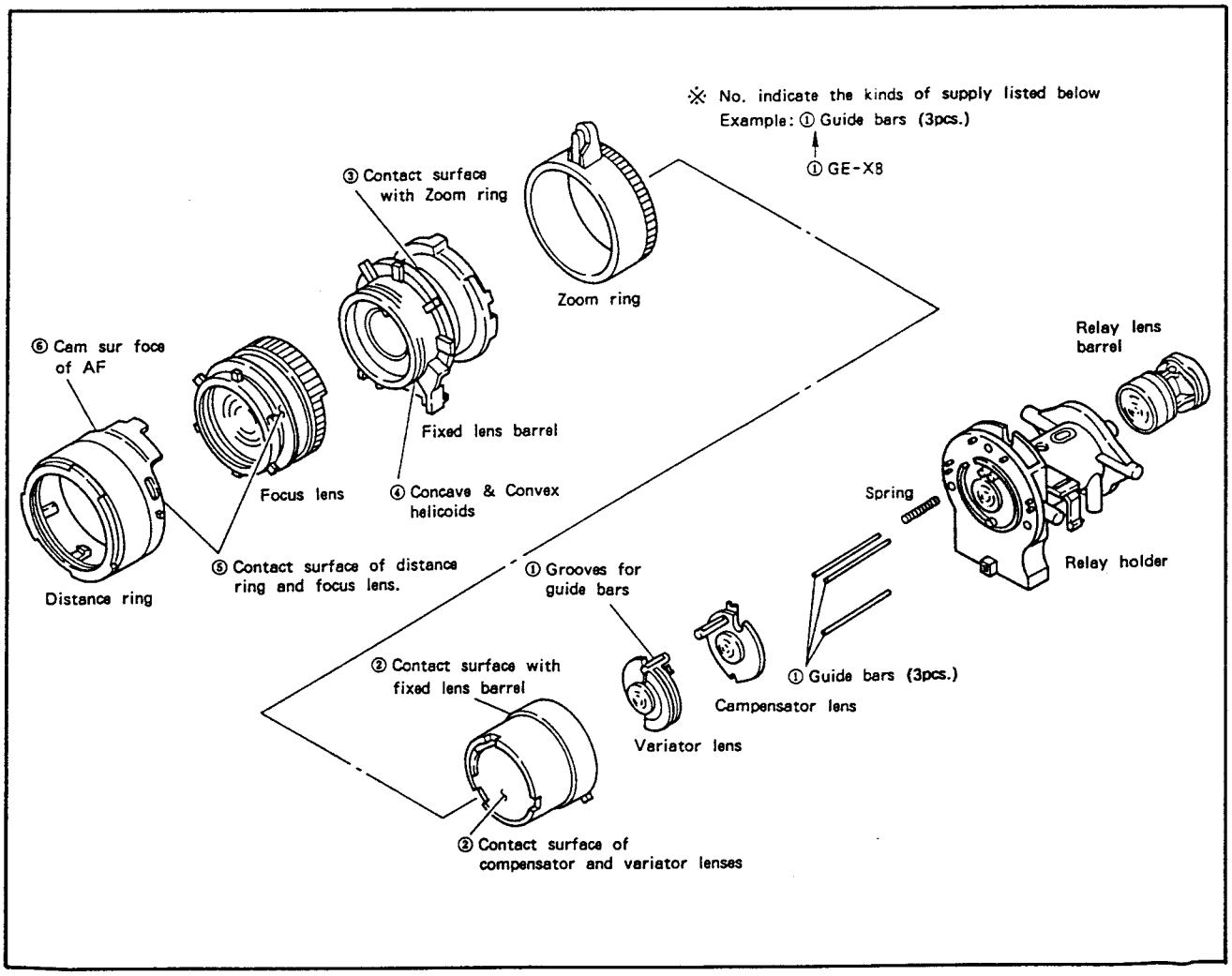


Fig. II-30

2-4 Disassembling of recorder section

2-4-1 Removal of drum shield

(1) Remove the screw ⓐ, and remove the drum shield.

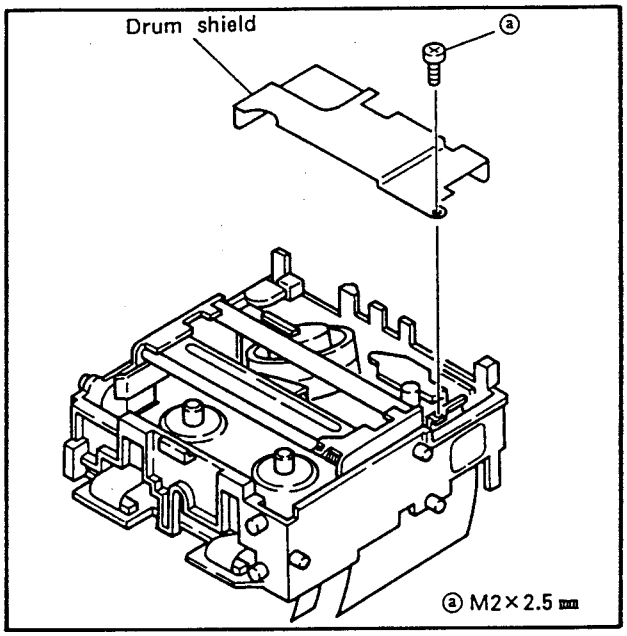


Fig. II-31

2-4-2 Removal of RECORDER-KEY C.B.A.

(1) Remove the CN405, and remove the RECORDER-KEY C.B.A.

* Notes: 1. When reassembling, align the holes of C.B.A. and the dowels of recorder holder.
2. If the C.B.A. is deformed by removing, replace it.

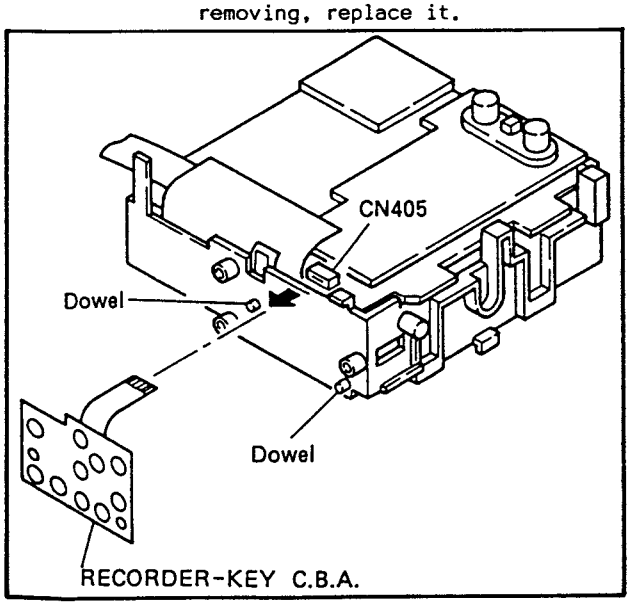


Fig. II-32

2-4-3 Removal of AUDIO C.B.A.

(1) Unplug the CN601, and remove the AUDIO C.B.A. by lifting.

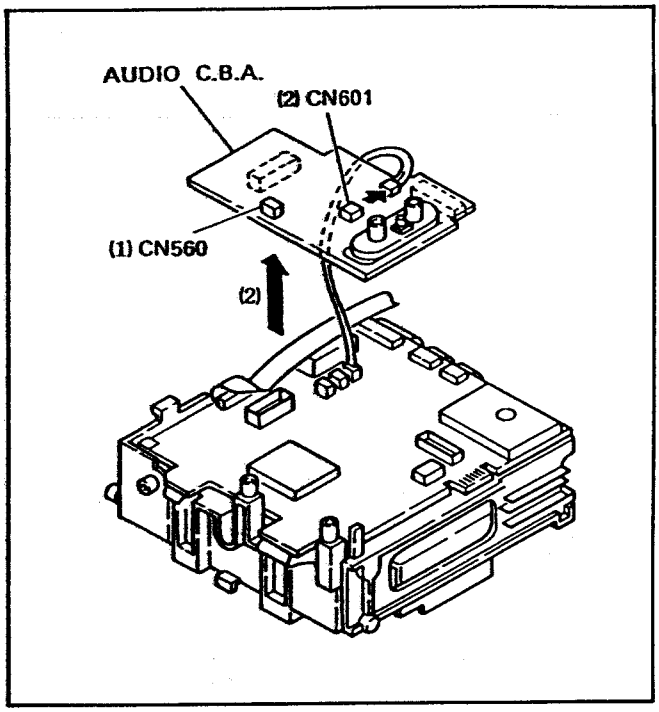


Fig. II-33

2-4-4 Removal of RECORDER-MAIN C.B.A. (Part I)

(1) Remove the screw ⓐ.
(2) Unsolder Ⓐ, and unplug the CN251.
(3) Unplug the CNs 407, 408 and 409.

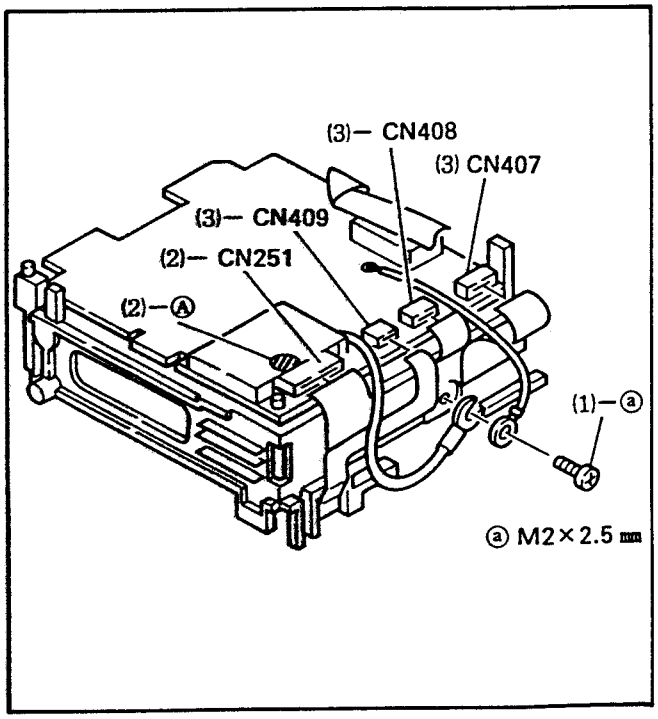


Fig. II-34

2-4-5 Removal of RECORDER-MAIN C.B.A. (Part II)

(1) Unhook the Ⓐ and Ⓑ, then, open the RECORDER-MAIN C.B.A. while shifting in the right direction.
(2) Unplug the CNs 402 and 403 to remove the RECORDER-MAIN C.B.A.

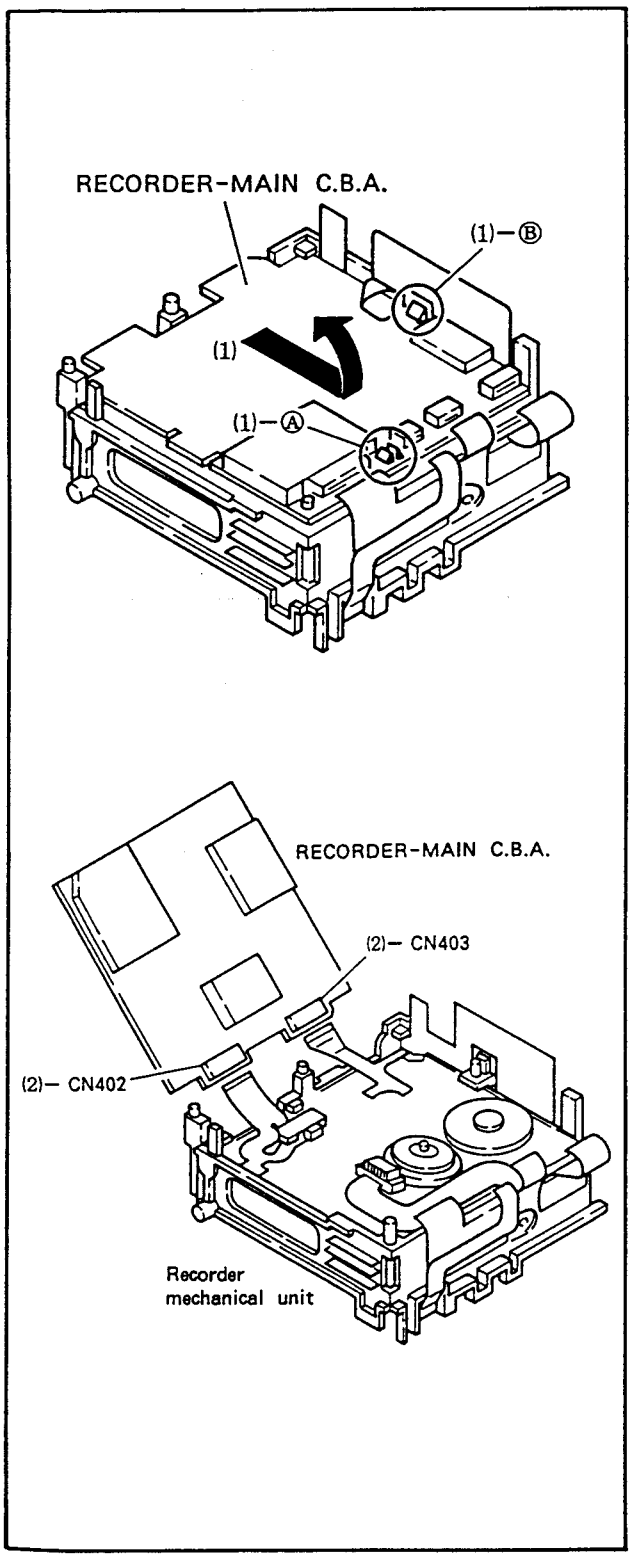


Fig. II-35

2-4-6 Removal of recorder holder

(1) Unplug the flexible connectors Ⓐ, Ⓑ, Ⓒ and Ⓓ.
(2) Remove two screw ⓐs and one ⓑ, and dismount the recorder holder upward.
(3) Remove the shield.

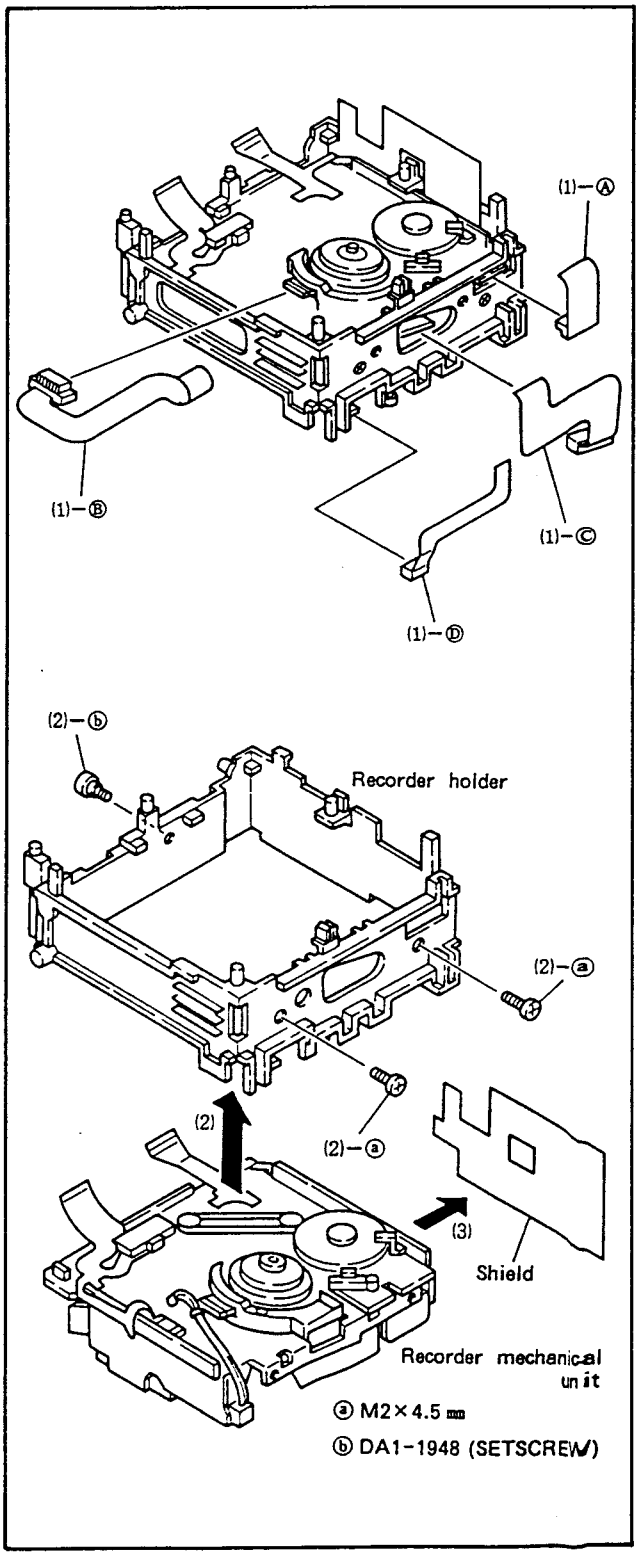


Fig. II-36

2-5 Wirings

2-5-1 GRIP C.B.A.

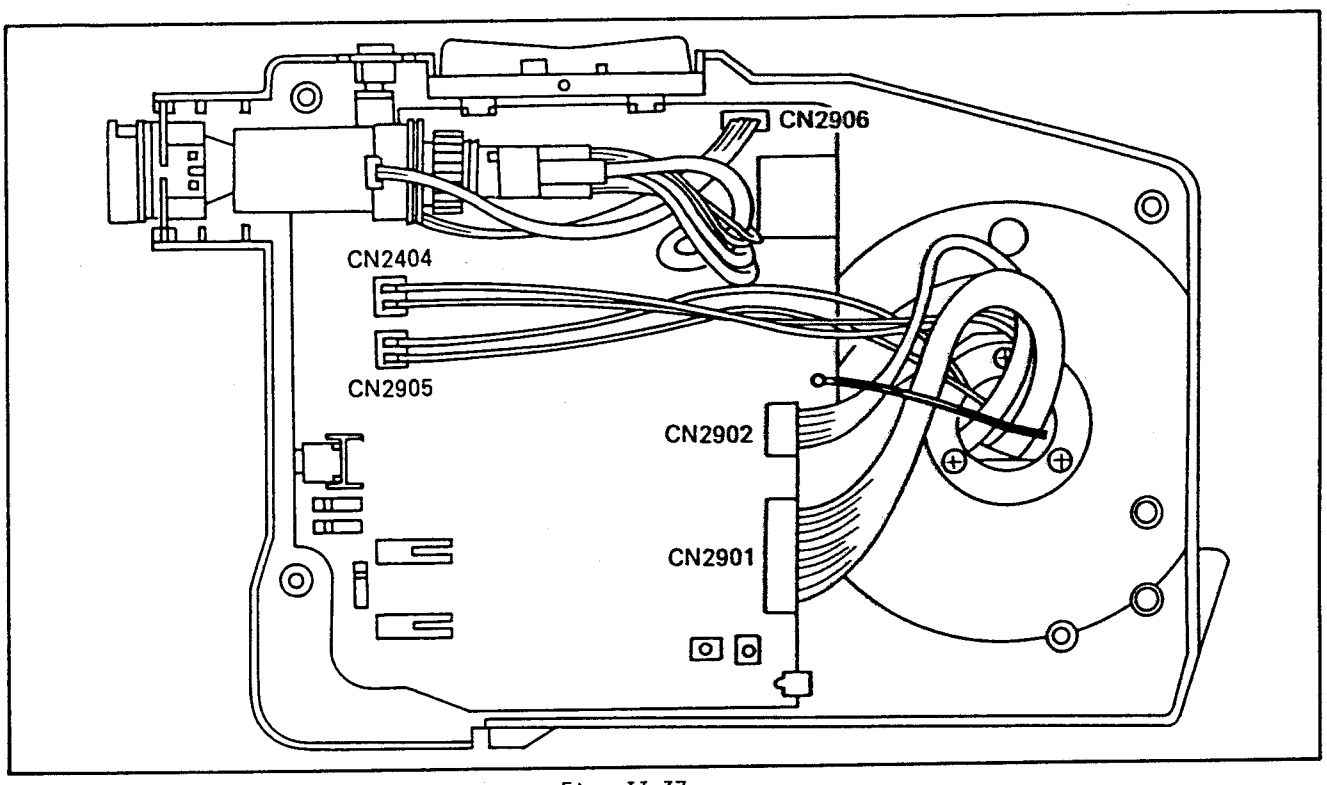


Fig. II-37

2-5-2 Recorder and camera units

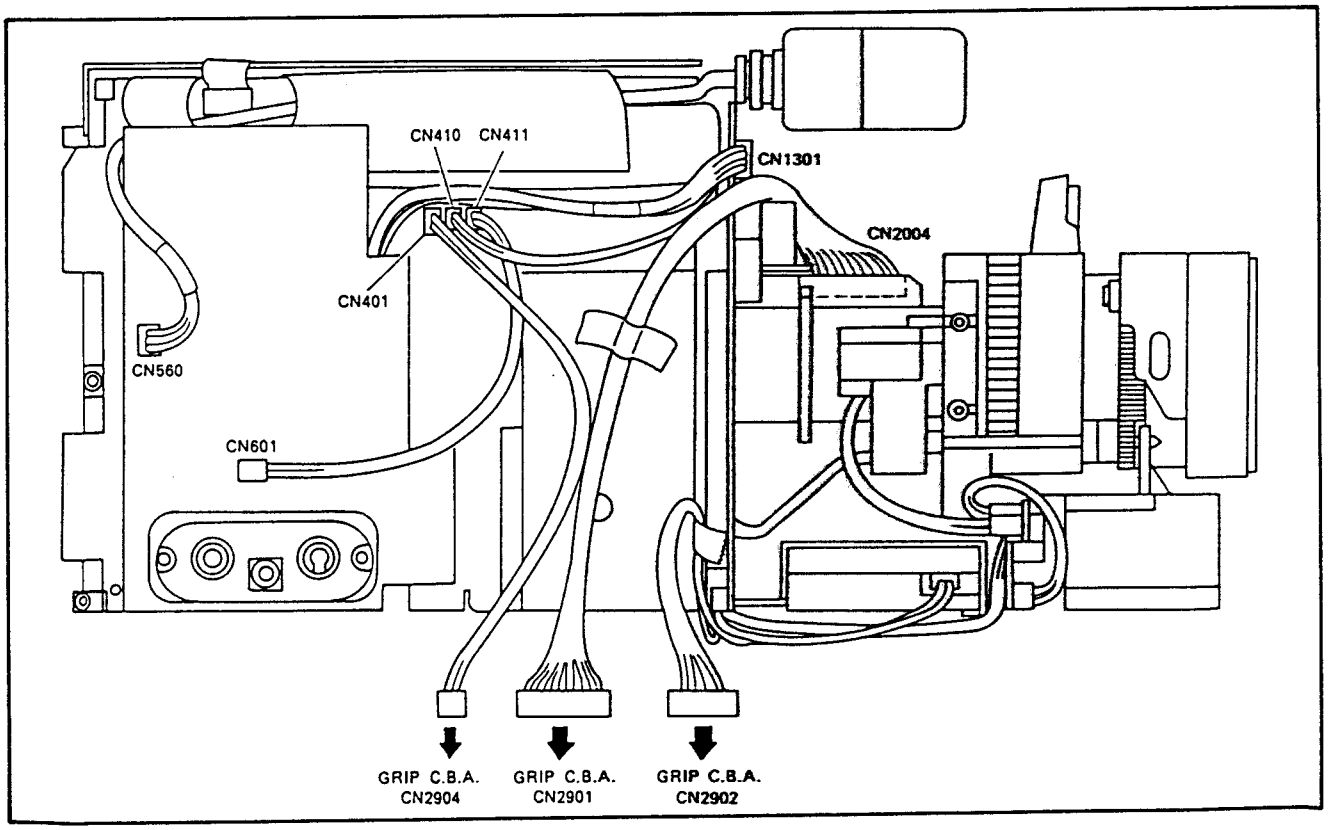


Fig. II-38

2-5-3 Camera unit only

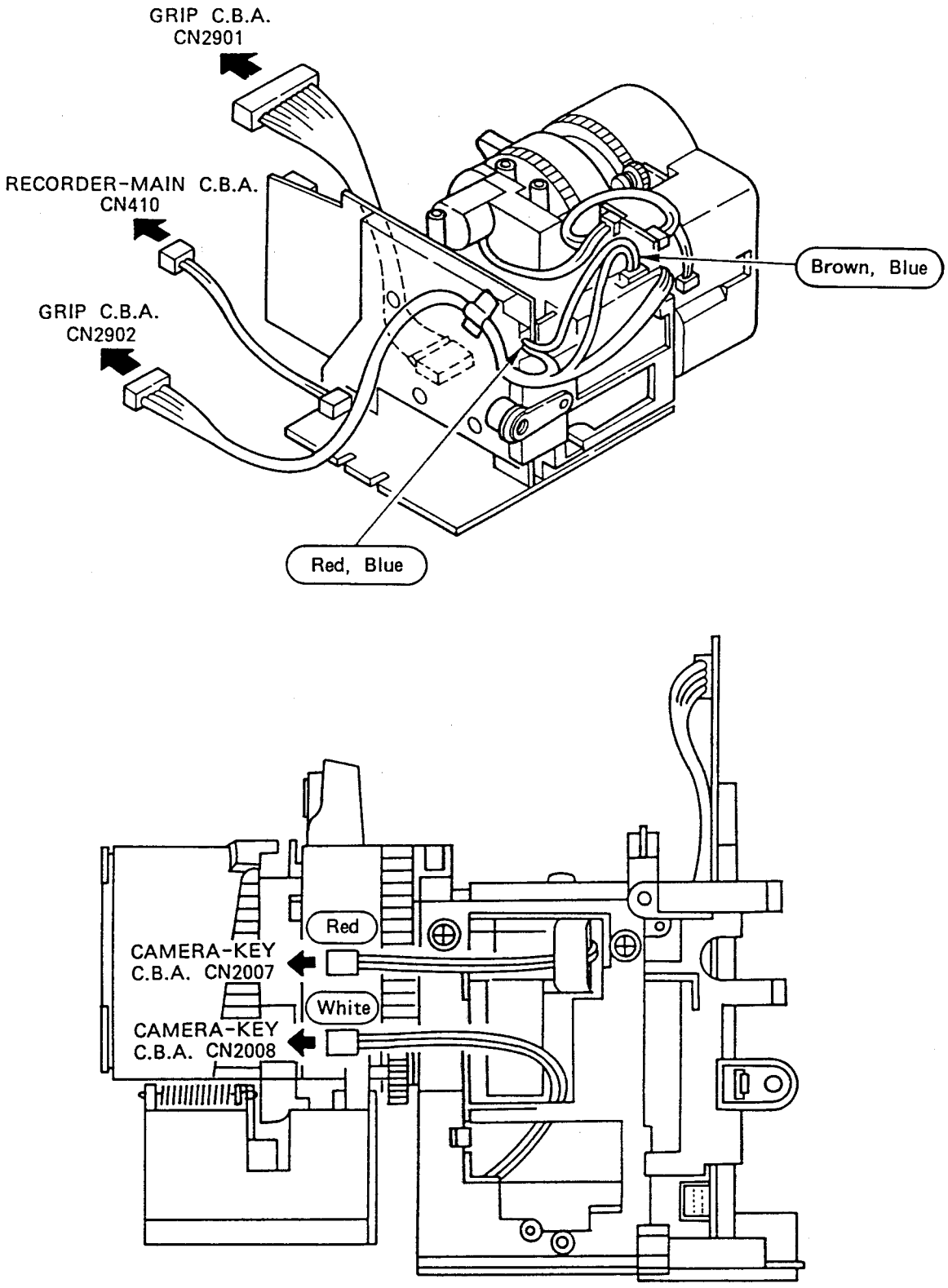
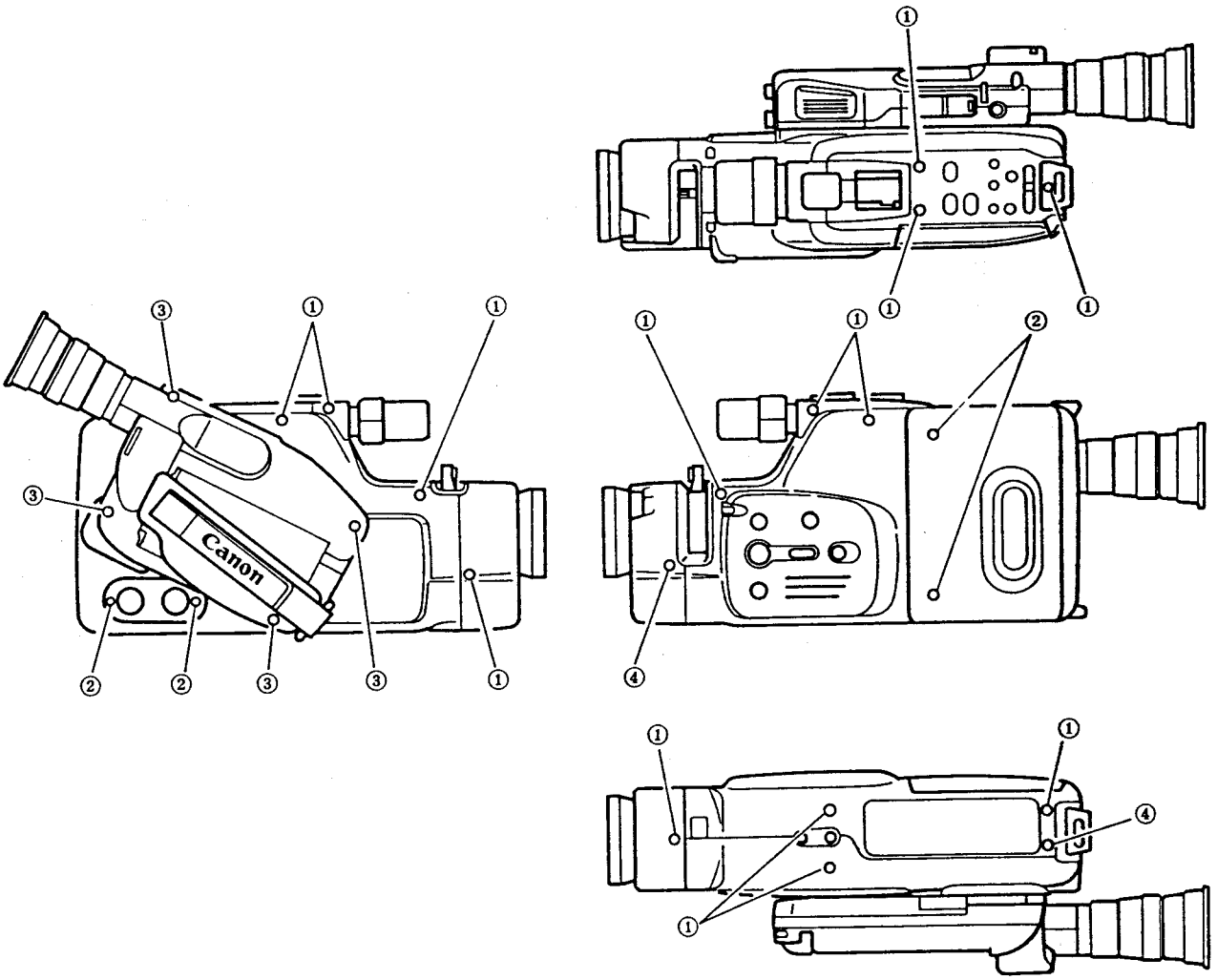


Fig. II-39

2-6 Screws position (External)



Parts No.	Sizes
① XA4-9200-409	M2.0× 4 mm (SELF TAP)
② XA1-7200-409	M2.0× 4 mm
③ XA4-9260-709	M2.6× 7 mm (SELF TAP)
④ XA4-9200-509	M2.0× 5 mm (SELF TAP)
⑤ DA1-4571	M2.0× 6 mm (SELF TAP)

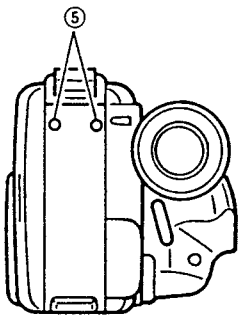


Fig. II-40

3. Preparation for Adjustment

3-1 Kinds of adjustment

The following adjustments are required.

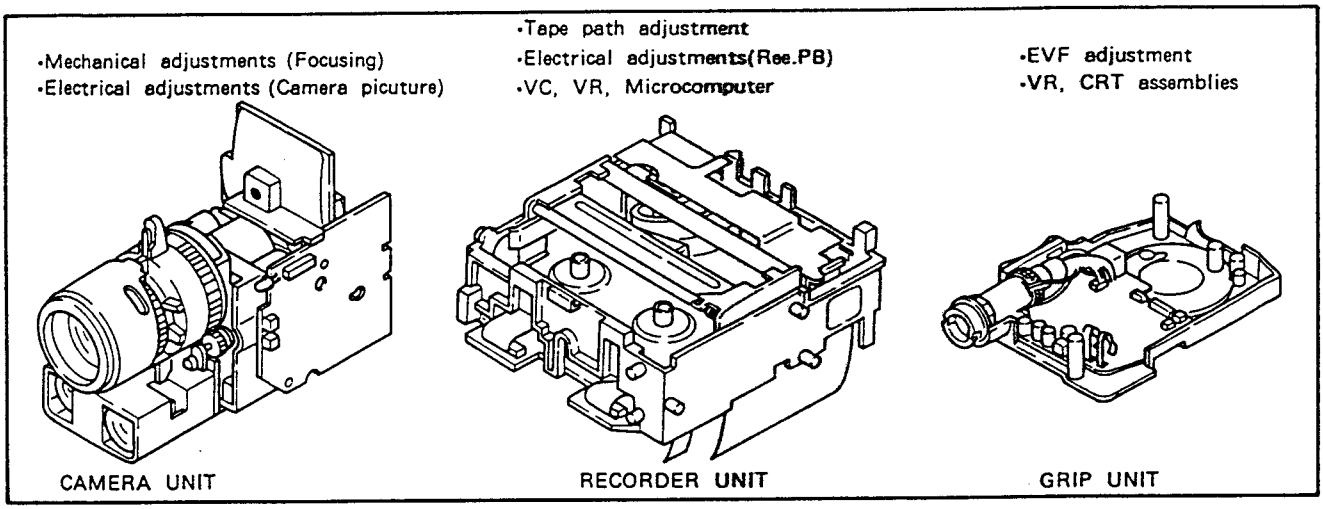


Fig. II-41

* Setting for each adjsutment

Location	Electrical/Mech.	Adj. item	Mode	Setting
Lens	Mechanical	AF. Focus	Normal	Basic setting
Camera	Electrical	VRs, VCs	Normal	Basic setting
		Microcomputer	Service Modes C1 to 5 ADJ MODE GND	Basci setting & Service mode setting (P. II-22)
Recorder	Electrical	VRs, VCs	Normal	Basic setting Note: For VRs under the AV C.B.A., add the procedures of 3-3 (P. II-20, "How to open C.B.A.s")
		Microcomptuer (Battery drop)	Service mode R1	Disassembling not necessary *1 (complete product)
	Mechanical	Tape transport	Service modes R2 and 3	Basic setting
EVF	Electrical and mechanical	EVF	Normal	6 V applied without the grip left cover. *2

*1 Setting for battery drop adjustment

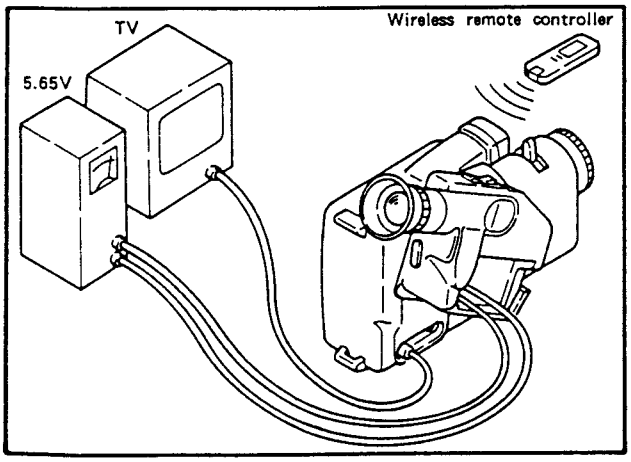


Fig. II-42

*2 Setting for EVF mechanical adjustment

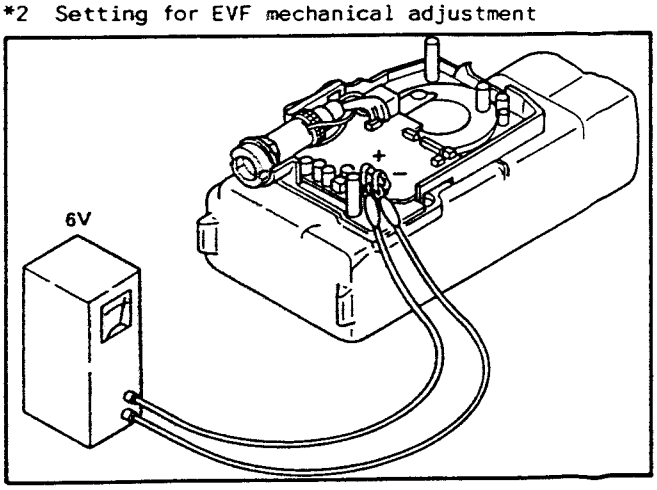


Fig. II-43

3-2 Basic setting

(1) Performable adjustments/checkings

By this basic setting, the following adjustments/checkings can be performed.

- Adjustments/checkings of camera and recorder units
  (The same adjustments/checkings as for the completely assembled product can be performed.)

- Adjustment/checkings of rear side of C.B.A.
  (The VR adjustments require the cable connection.)

(2) Equipments

- Extension cables ..... a, b, c, d, e, h and i (DY9-1117-000)

- Constant voltage supplier (6V)

- Cable for connecting the constant voltage supplier and the EVF.

(3) Procedures: 1) Disassemble the main unit into the camera and the recorder units.

2) Connect the camera unit, the recorder unit and the GRIP C.B.A. using the cables. (See Fig. II-44)
   * Note: If the digital memory function is not used, the connections of l and m are not necessary.

3) Supply the 6V from the constant voltage supplier to the battery edge of EVF.

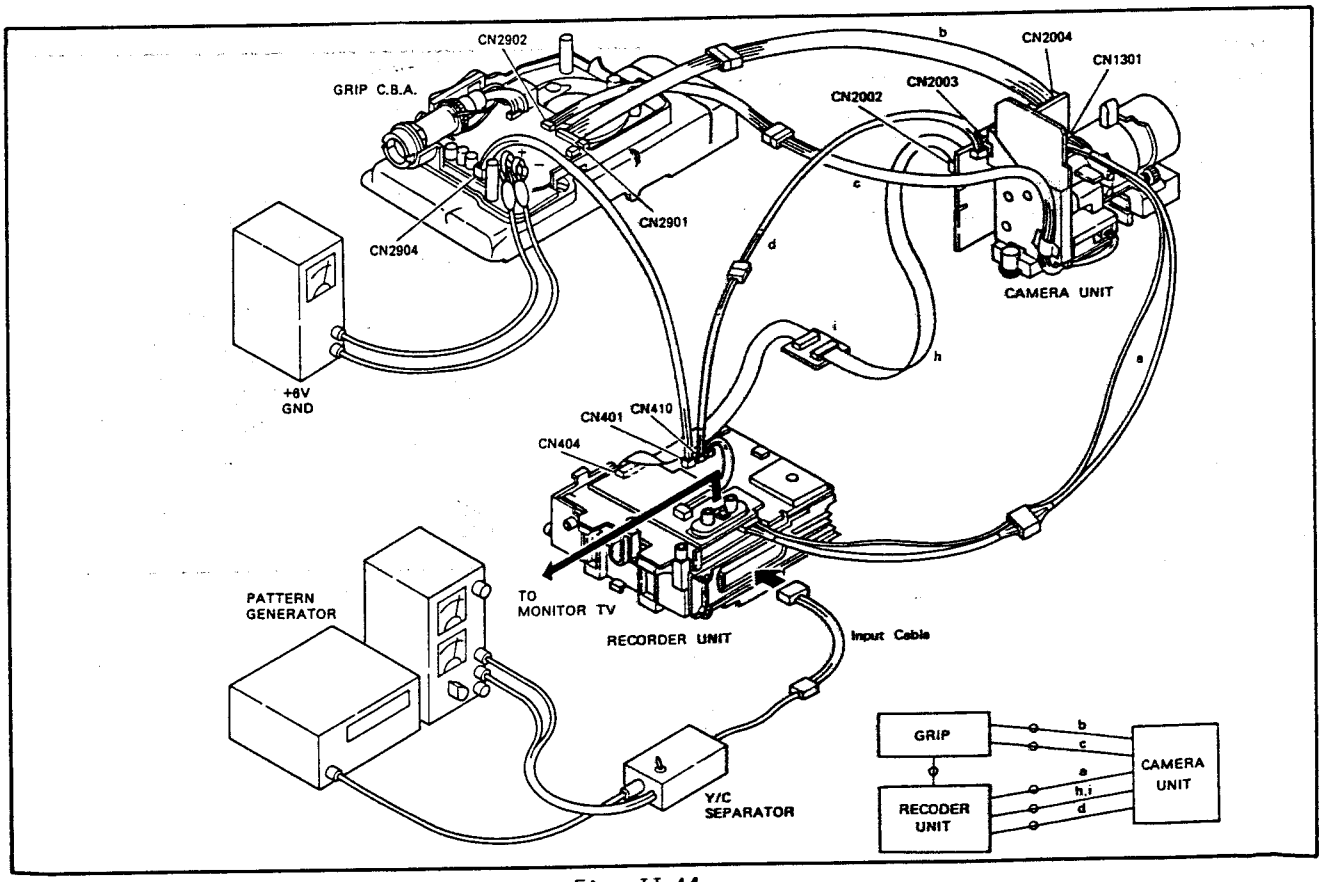


Fig. II-44

3-3 How to open C.B.A.s

3-3-1 C-KEY C.B.A. (Fig. II-45)

To check the components at rear side of C-KEY C.B.A., perform the proceudre below.

Procedures:

(1) Dismount the C-KEY C.B.A.
Then, connect the C-KEY C.B.A. and the C-MAIN C.B.A. via an extension cable p.

C-KEY C.B.A. Extension cable C-MAIN C.B.A.
CN09 (2009) ⟷ p ⟷ CN1401

(2) To operate the AF and PZ motors, connect the motor to the CNs 07 and 08.
To use the wireless remote controller, connect the REMOCON C.B.A.

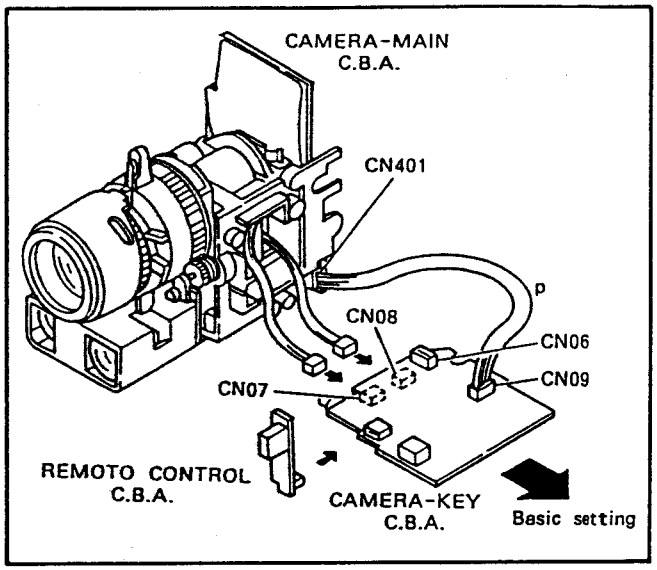


Fig. II-45

3-3-2 C-MAIN C.B.A. (Fig. II-46)

By removing the lens unit, and performing the following procedures, the components at rear side of C-MAIN C.B.A. can be checked.

Procedures:

(1) Dismount the C-MAIN C.B.A. and the DC/DC converter from the lens and camera holders.

(2) Connect the DC/DC converter to the C-MAIN C.B.A.

(3) Connect the C-MAIN C.B.A. and the C-KEY C.B.A. via an extension cable P.

C-KEY C.B.A. Extension cable C-MAIN C.B.A.
CN09 (2009) ⟷ p ⟷ CN1401

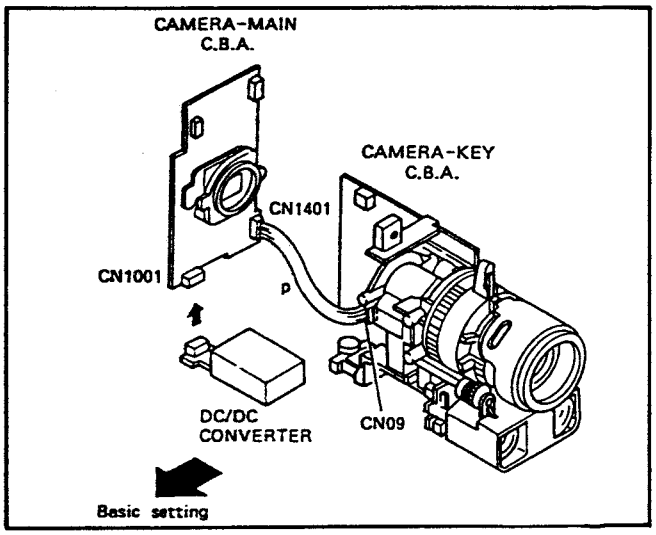


Fig. II-46

* Remarks: The connection with the lens unit is unnecessary because the lens unit is not used.

3-3-3 **AV C.B.A.** (Fig. II-47)

Under the following status, the VRs under the AV C.B.A. (rear side also) can be checked.

(1) Disconnect the AV C.B.A. with the CN601 connected.

(2) Connect the AV and R-MAIN C.B.A.s via the extension cables f and g.

R-MAIN C.B.A.		Extension calbe		AV C.B.A.
CN102	⟷	f	⟷	CN601
CN406	⟷	g	⟷	CN603

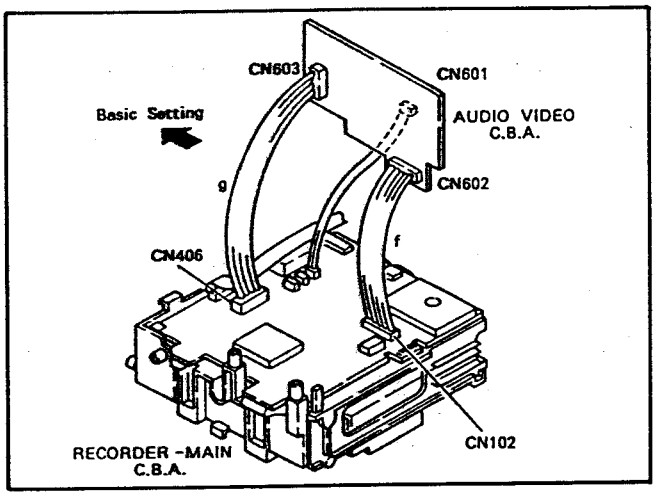


Fig. II-47

3-3-4 **R-MAIN C.B.A.** (Fig. II-48)

Under the following status, the components under the R-MAIN C.B.A. and the rear side of recorder mechanical section can be checked.

(1) Disconnect the CNs 402, 403, 405 and 408 to open the R-MAIN C.B.A. (Do not disconnect the CNs 407, 409 and 251.)

(2) Connect the R-MAIN C.B.A., recorder mechanical section and the R-KEY C.B.A. via the extension cables K, L, N, O, j, k, n and o.

R-MAIN C.B.A.		Extension cable		
CN402	⟷	L+N	⟷	Recorder-Mech.
CN403	⟷	K+O	⟷	Recorder-Mech.
CN405	⟷	j+k	⟷	R-KEY C.B.A.
CN408	⟷	n+o	⟷	Drum Motor

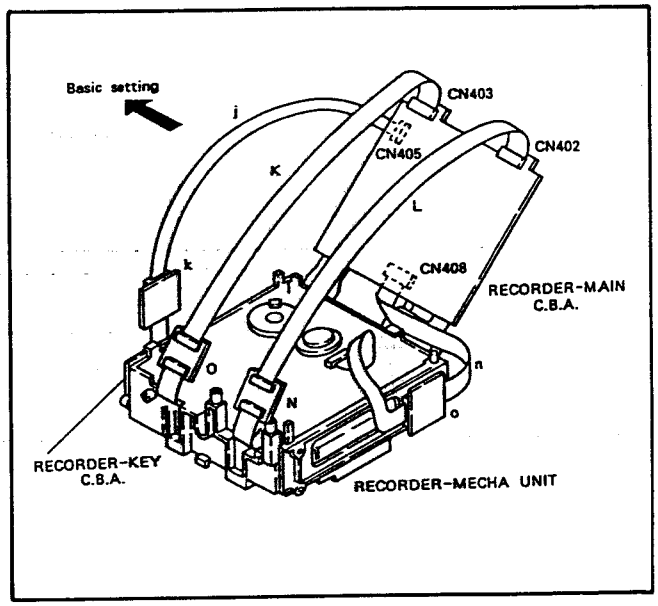


Fig. II-48

3-4 Service modes

3-4-1 Function

By setting the service mode, the each operation of this model (microcomputers, tape transport, etc.) can be checked without disassembling the unit while viewing the character display on monitor TV.

All data of microcomputers are displayed as shown in the Fig. II-49.

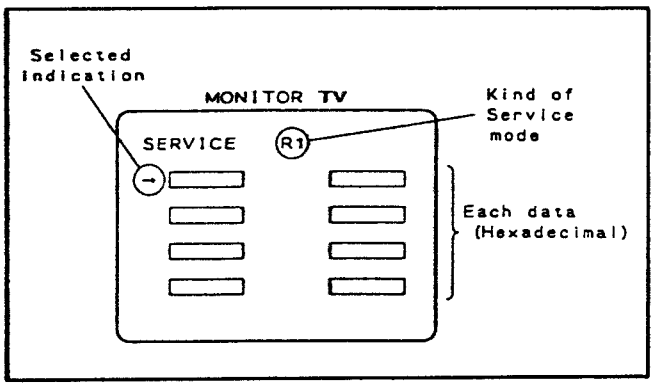


Fig. II-49

* Note: During the service mode setting, the following error detecting functions are cancelled.
  - Drum rotation error
  - Capstan rotation error
  - Reel rotation error

3-4-2 How to set the service mode

Each time the pattern of wireless remote controller* indicated in the Fig. II-50 is short-circuited, the 16 kinds of service mode can be set as follows.

* The wireless remote controllers are provided as service parts.

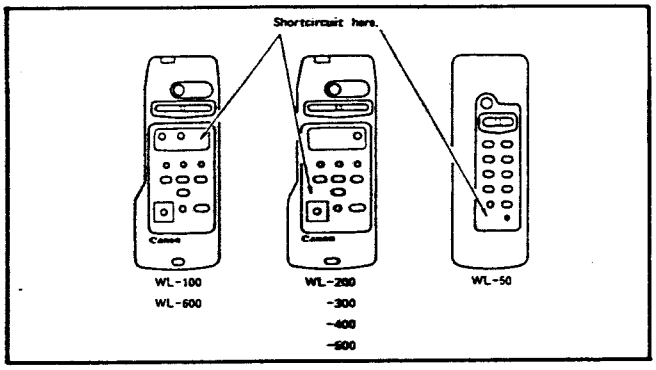


Fig. II-50

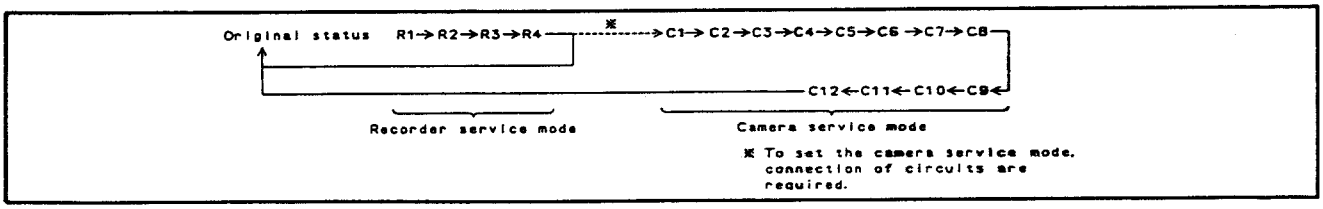


Fig. II-51

To set the camera service mode, connect the pin 7 of CE01 (CAMERA-KEY C.B.A.) to ground via the extension cable q.

Pin 7-CE01 (ADJ MODE) ⟷ Pin 8-CE01 (GND)

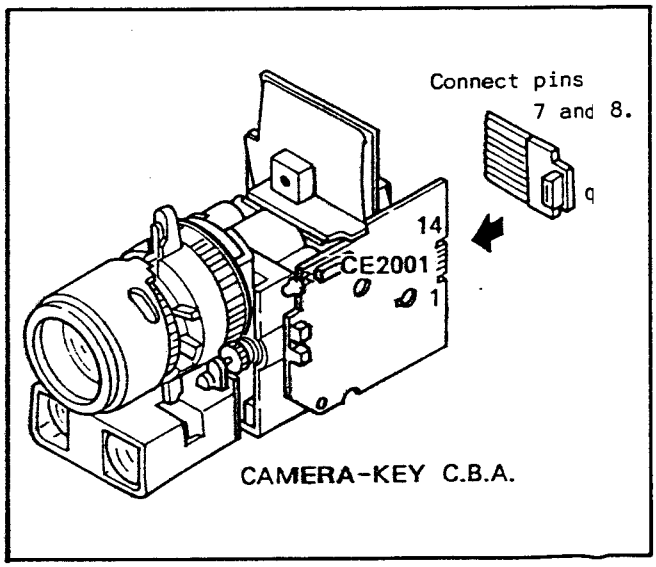


Fig. II-52

3-4-3 Data setting

To select the desired data and make adjustments, manipulate the following keys.
(The wireless remote controller can be used.)

(1) STOP [■] Data selecting key

Every pressing this key shifts the menu item.

(2) REW [◀◀] Upper bit selecting key

Every pressing this key varies the upper bit value.

(3) FF [▶▶] Lower bit selecting key

Every pressing this key varies the lower bit value.

(4) REC [●] Data writing key

Pressing this key writes the current data into the E^2PROM.
If the microcomputer judges that the writing is not necessary, "OK" apepars after the each data.

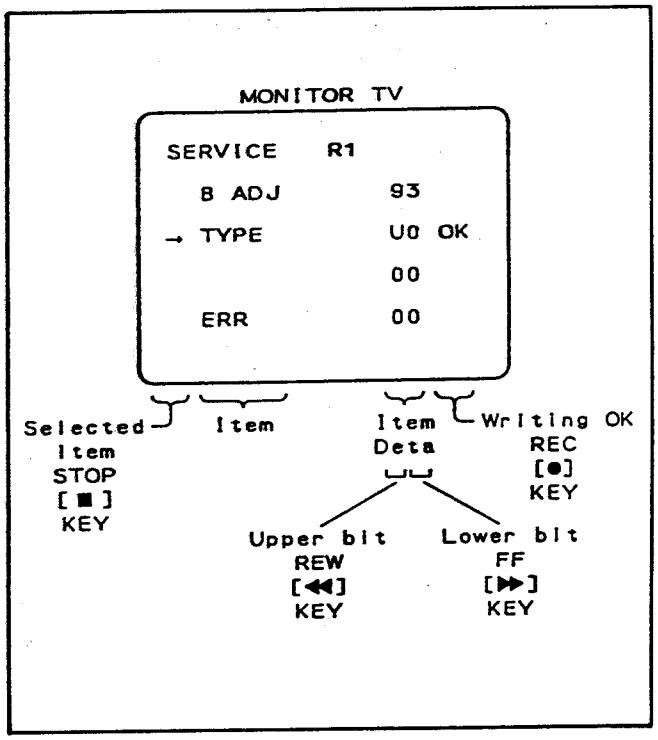


Fig. II-53

3-4-4 Explanation of each mode

(1) RI : Insufficient battery voltage, Type of TV systems, History of errors

° B ADJ: Insufficient battery voltage

The voltage when the REC key is pushed is displayed.

* FF, REW keys are not usable.

° TYPE: Type of TV systems

Upper bit = U → USA, P → PAL,
J → JAPAN, S → F-PAL
Lower bit = 0 → E40, 3 → E61, 63, 65

° ␣␣: Not used

° ERR: History of errors

The all errors which the equipment experienced since manufactured are displayed. (On occurrence, "1" appears as shown in the Fig. II-55.)

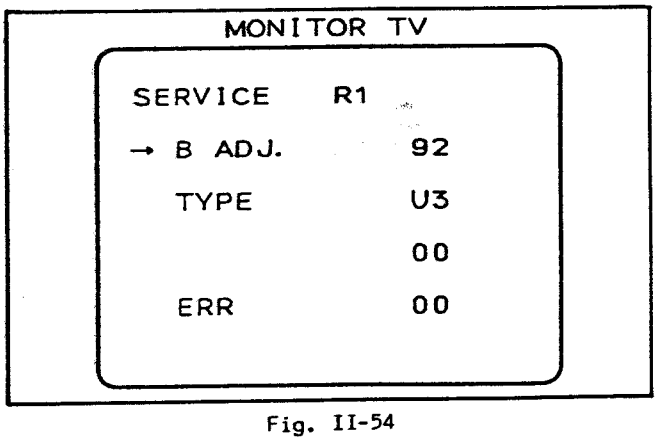


Fig. II-54

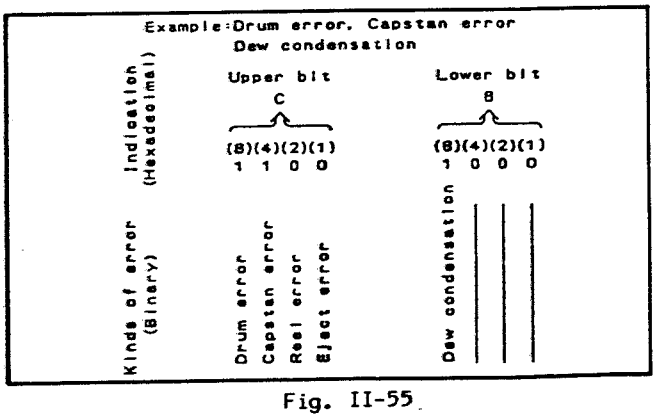


Fig. II-55

Each error is memorized in binary, and displayed in hexadecimal notation. (See the Fig. II-55)

The number of occurrence and the time or date of occurrence cannot be memorized.

By using the FF/REW key, the data can be erased.

* Note: If the error occurs during the palyback mode, the data displayed is not effective, because no power is supplied to the camera microcomputer at this time. (E^2PROM)

(2) **R2, R3** : Tape transport adjustment (Refer to the Service Manual for the MC-4B)

By varying the duty ratio of Head SW pulse, the RF envelope of 220° can be checked. (Fig. II-56)

° R2: Ordinary tracking, 100% RF envelope output

(Power LED blinks in 0.5 sec.)

° R3: Tracking at offsetting, 70% RF envelope output

(Power LED blinks in 1 sec.)

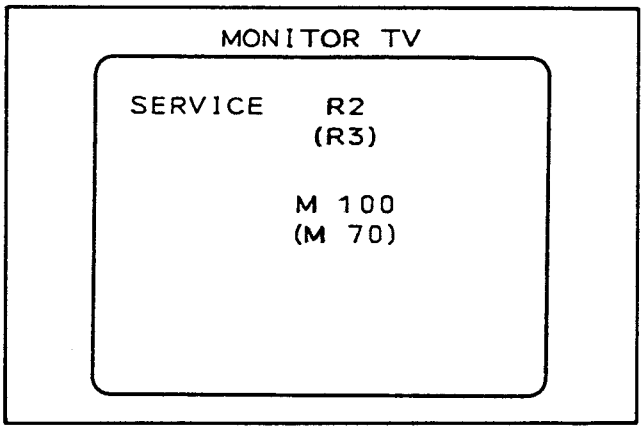


Fig. II-56

(3) **R4** : Current error detection (Fig. II-57)
On occurrence, "↓" appears.
"↑" appears under normal condition.

° D = Drum error
° C = Capstan error
° R = Reel error
° L = Loading motor error
° DE = DEW sensor
° B = Insufficient battery voltage
° T = BOT sensor
° E = EOT sensor

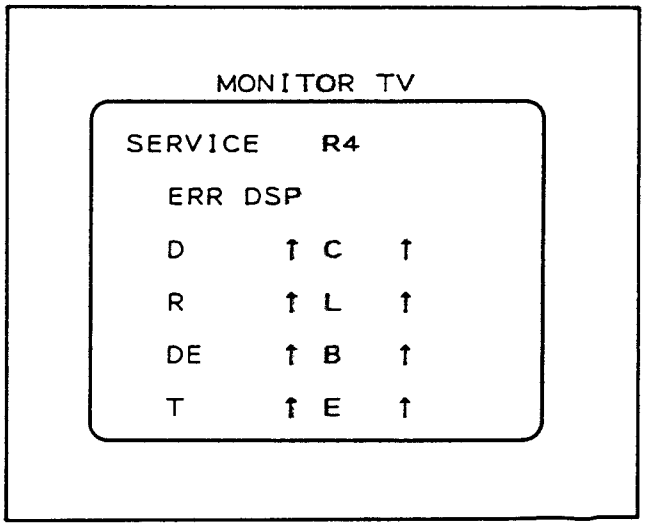


Fig. II-57

(4) C1 : Camera electrical adjustments

The current value is displayed in hexa-decimal notation. (Fig. II-58)

- CCD R = CCD RESET pulse adjustment
- B PHASE = Burst phase adjustment
- O.B = OB set adjustment
- Y = Auto iris adjustment

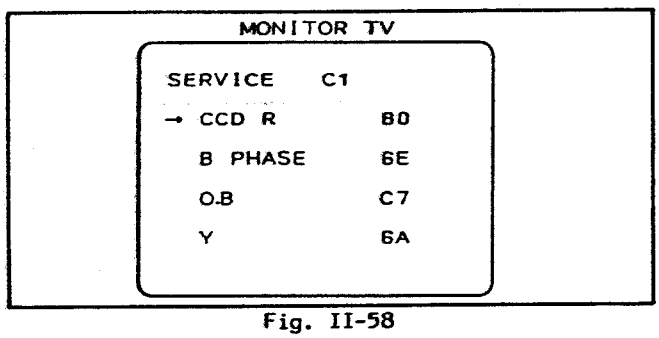


Fig. II-58

(5) C2 : Camera electrical adjustments

The current value is displayed in hexa-decimal notation. (Fig. II-59)

- AGC = AGC adjustment
- FH/2 = FH/2 color differential adjustment
- OFFSET = Color differential gain adjustment
- ␣ ␣ = Not used

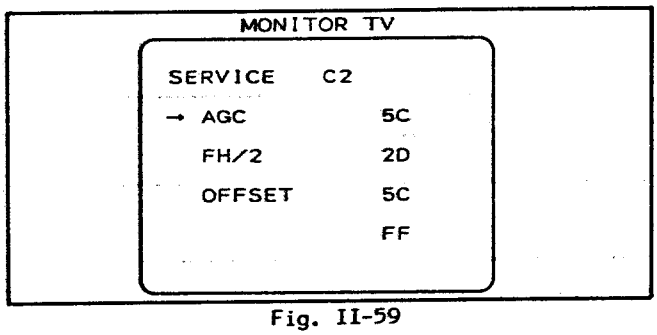


Fig. II-59

(6) C3 : Camera electrical adjustments

The current value is displayed in hexa-decimal notation. (Fig. II-60)

- BL R = R of carrier balance adjustment
- BL B = B of carrier balance adjustment
- WB R = R of white balance adjustment
- WB B = B of white balance adjustment

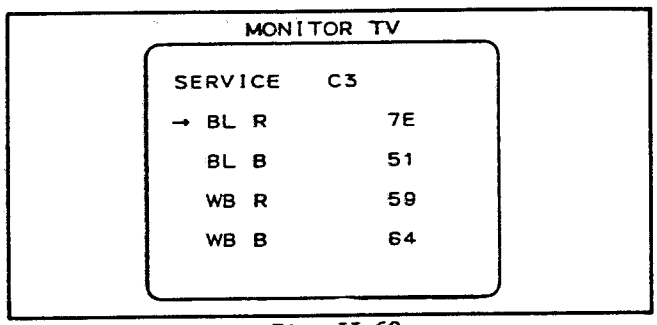


Fig. II-60

(7) C4 : Camera electrical adjustments

The current value is displayed in hexa-decimal notation. (Fig. II-61)

- C.GAIN R = R of chroma gain adjsutment
- C.GAIN B = B of chroma gain adjustment
- ␣ ␣ = Not used
- ␣ ␣ = Not used

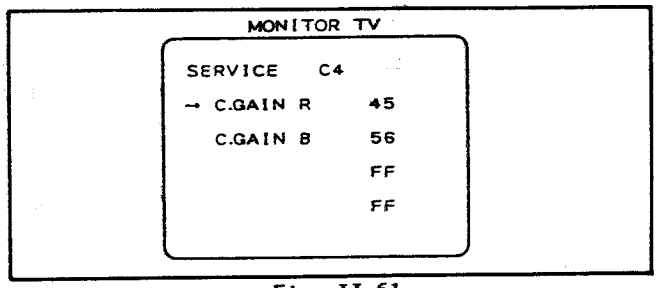


Fig. II-61

(8) C5 : Camera electrical adjustments

The current value is displayed in hexa-decimal notation. (Fig. II-62)

- W.CLIP = White clip adjustment
- CCA1 = FAWB adjustment 1
- CCA2 = FAWB adjsutment 2
- ␣ ␣ = Not used

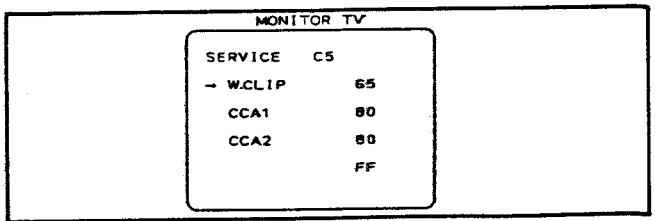


Fig. II-62

(9) C6 - C12 : Control reference data
* Do not change the data of these modes. (Fig. II-63 - 69)

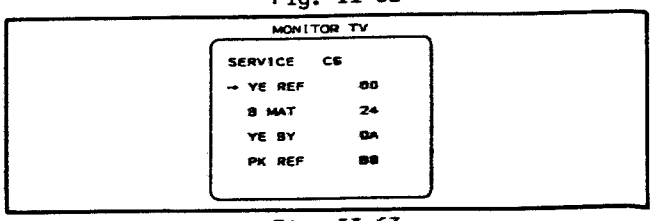


Fig. II-63

• Sample screen display

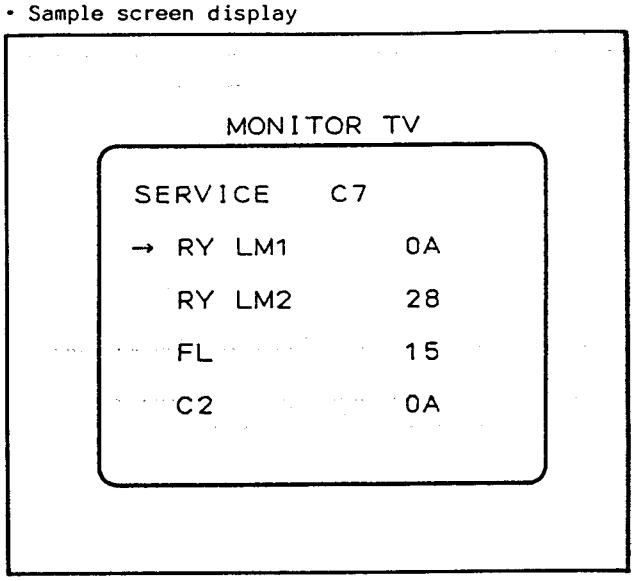


Fig. II-64

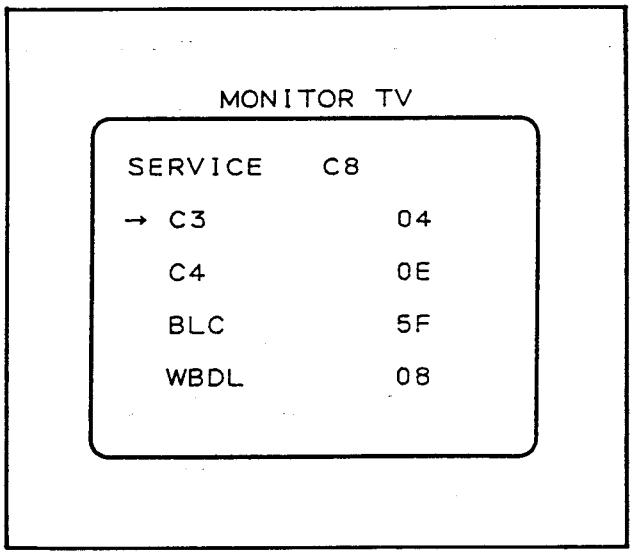


Fig. II-65

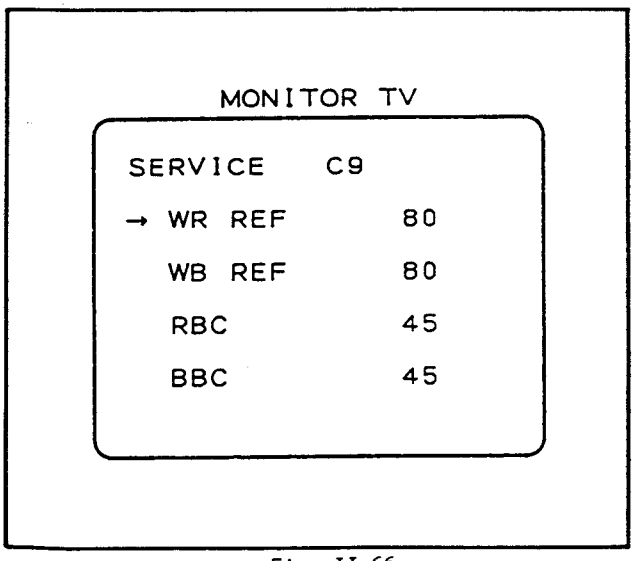


Fig. II-66

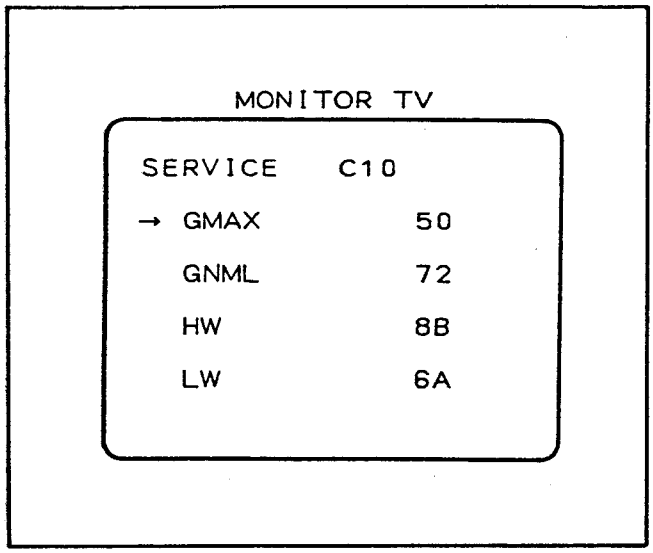


Fig. II-67

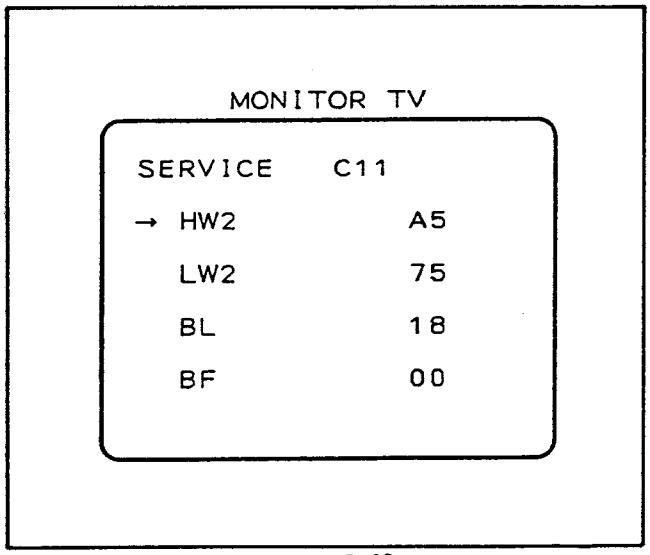


Fig. II-68

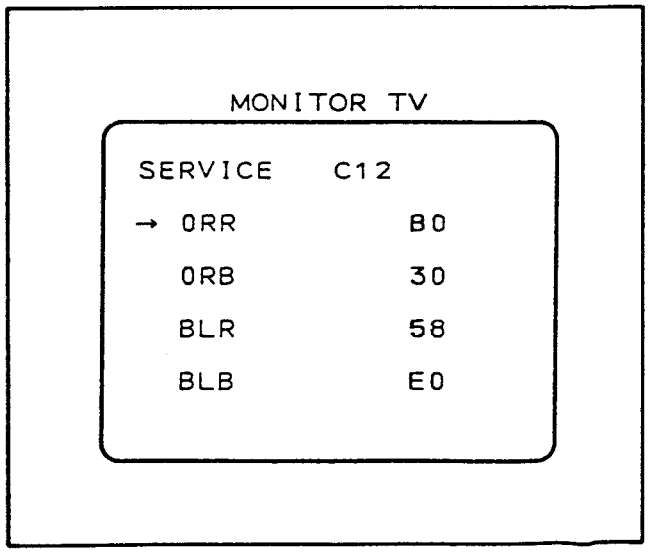


Fig. II-69

3-5 Charts

(1) Fixture (Appendix for the A1)

The fixture is used for the blooming adjsutment. Attach the fixture onto the front face of lens, then attach the each instructed filters. (Fig. II-70)

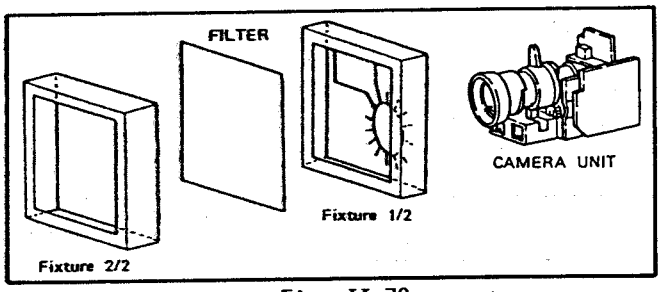


Fig. II-70

(2) U-chart

Make a U-chart by cutting a "U" pattern off from the center of black paper.
Size is detailed in the Fig. II-71. ("⧖" marks indicate the standard picture frame.)

* Note: For the blooming adjustment, attach a piece of white paper onto the rear side.

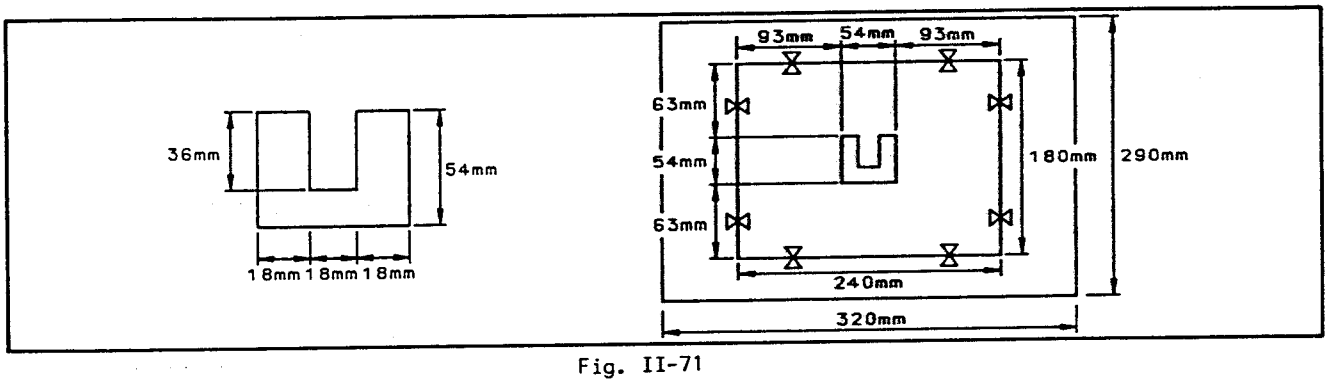


Fig. II-71

3-6 Other precautions

(1) Prior to each adjustment, energize the equipment for 3 minutes or longer.

(2) Set the light box at color temperature 5600°K.

(3) "Standard angle of view"

- The "standard angle of view" is given when the charts displayed so as to meet the maximum screen of the full scan monitor.
- With an oscilloscope, adjust the grayscale (36 μs) and the color bar (52 μs) followed by shooting.
- Shoot the white chart at its center.
- Unless otherwise specified, shooting distance must be 1.4 m.

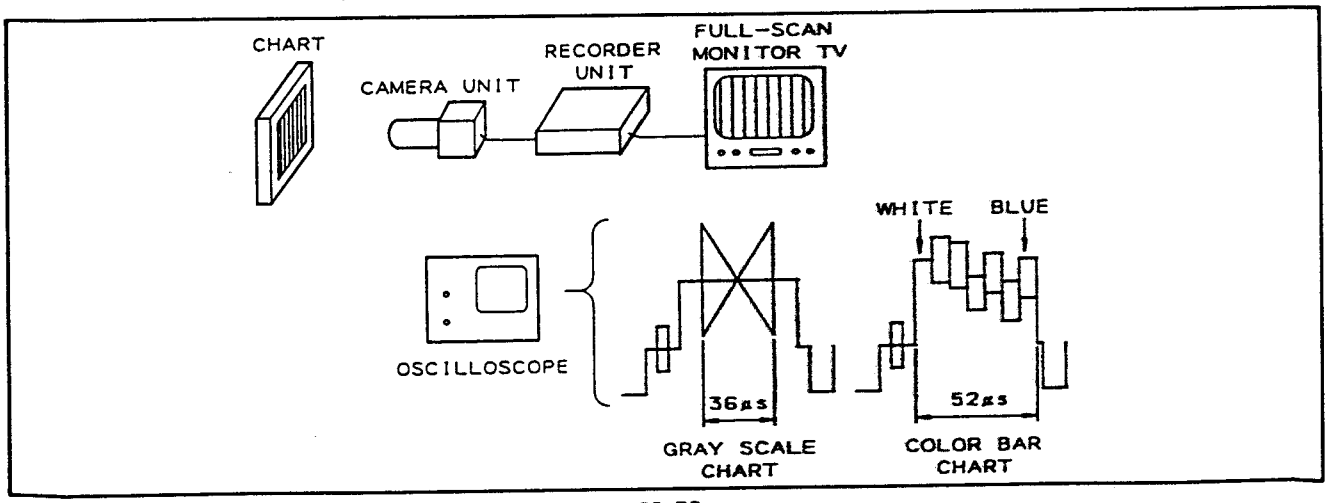


Fig. II-72

4. Adjustment of Lens Section

4-1 Back focus adjustment (T/W zoom correction)

* Note: Open the aperture fully as possible.

CHART	Siemens chart (located 3 m away)
M. EQ.	Monitor TV
TOOL	Phillips screwdriver
ADJ.	Distance ring, relay lens
SPEC.	Eliminate defocusing at T/W lens

Procedures:

(1) Loosen the screw ⓐ.
(2) With the telephoto-end zoom setting, bring the pattern image into focus by turning the distance ring.
(3) With the wide-angle end zoom setting, bring the pattern image into focus by moving the relay lens back and forth.
(4) Repeat the above steps (2) and (3) to remove defocusing at the telephoto and wide angle ends.
(5) Tighten the screw ⓐ while paying attention not to move the relay lens.
(6) Perform the AF distance measurement adjustment (4-2).

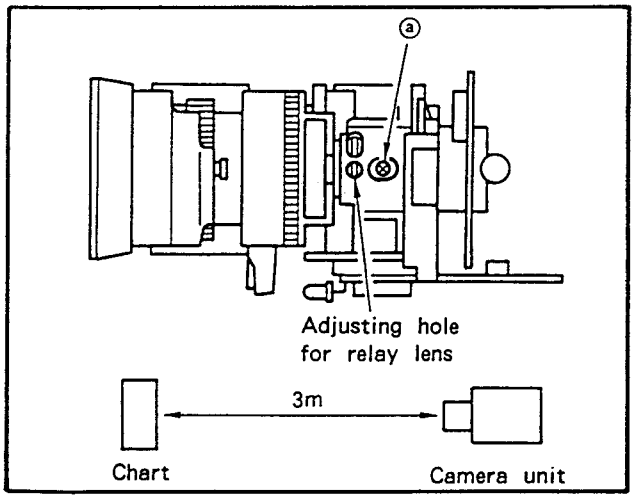


Fig. II-73

4-2 AF distance measurement adjustment

* Note: Open the aperture fully as possible.

CHART	Siemens chart, reflectance plate (60% or more)
M. EQ.	Monitor TV
TOOL	Hexagonal key wrench (1.27 mm) Section paper, index
ADJ.	Adjusting screw of AF distance measurement (ⓐ in the Fig. II-74)
SPEC.	+0.75 mm -1.0 mm (+: infinity)

Procedures:

(1) Put the section paper and the indicator on the ring.
(2) Shoot the siemens chart at 3 m distance.
(3) With telephoto-end, bring the image into focus, and mark the position of indicator on the section paper.
(4) Replace the Siemens chart with the reflectance plate of 60% or more.
(5) Make the center of stop positions of infinity end and the closest end on the section paper.
(6) Check if the difference between the stop positions marked at steps (3) and (5) is within the rating.
(7) If not, adjust the screw ⓐ with a hexagonal wrench.

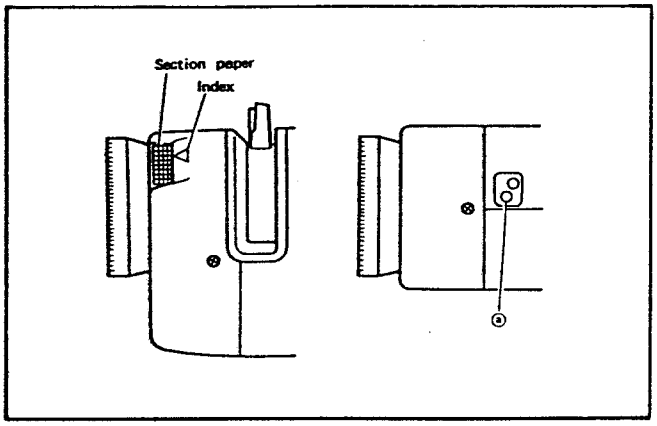


Fig. II-74

4-3 Preparation for afocal adjustment

* Note: Carry out this adjustment by using an actual scene of infinity (150 m or more) or a collimator.

Described below is the procedure by using a single-lens reflex camera instead of collimator.

CHART	Ground glass
TOOL	Single-lens reflex camera lens (focal length: 300 mm or more) Magnifier

Procedures:

(1) Open the aperture of single-lens reflex camera fully. Then, open a rear lid.

* Note: If the shutter equips the valve mechanism, lock it for opening the aperture.
If not (e.g. Canon T series, etc.) open the aperture by using the slow shutter function. (Take out the internal battery while the shutter is opened.)

(2) Secure the ground glass on the inside rail face by pressing it.

* Note: At this step, the surface of ground must be at the lens side.

(3) Shoot a scene at infinity. Then, enlarge the image on the ground glass surface with a magnifier to check the focusing state.

* Note: For the distance for infinity, refer to the Fig. II-75.

(4) After the above checking, remove the ground glass once, and mark the cross-hairline on the ground glass surface. Then, attach it to the camera again.

* Remarks: Using the above collimator, the back focus adjustment (4-1) can be performed accurately in a short time.

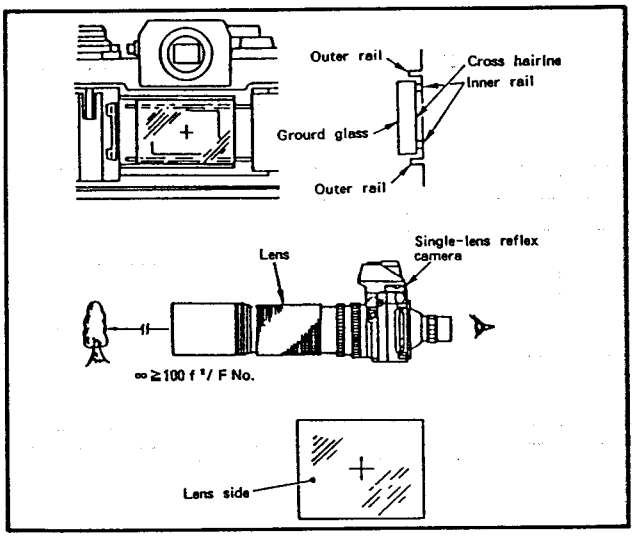


Fig. II-75

4-4 Afocal adjustment

* Note: Perform this adjustment only when the focus lens assembly is replaced or disassembled.

Described below is the procedures by using a single-lens reflex camera instead of a collimator.

CHART	Ground glass
M. EQ.	Monitor TV
TOOL	Single-lens reflex camera/lens (300 mm or more) Phillips screwdriver
ADJ.	Focus lens group, relay lens
SPEC.	Smaller than 1/3 of infinity mark width (± 0.5 mm)

Procedures:

(1) Assemble the concave helicoid and the distance ring.

(2) Remove the N stopper, and dismount the focus lens assembly.

* Note: When reassembling, be careful not to damage the thread by excessive force. Also, apply the grease for fixing.

(3) Align the lens axes of single-lens reflex camera and the equipment as accurately as possible. (Visual check)

(4) Bring the image into focus with telephoto-end zoom setting by using a front lens.

* Notes: 1. For use of 8x lens; Distance ring must be butted to the infinity stopper.
2. For use of 10x lens; Distance ring must be positioned at 0.8 mm before the infinity stopper.

(5) Loosen the screw (a).

(6) With the wide angle end zoom setting, move the relay lens back and forth to focus the image.

(7) By repeating the steps (4) and (6), eliminate the defocusing at telephoto and wide angle ends.

(8) By blocking the relay lens, confirm that there is no defocusing.

(9) Confirm that the distance ring is butted to the infinity stopper. Then, secure the ring and the concave helicoid with Alonalpha.

* Notes: 1. Do not apply the adhesive excessively. Also, be careful not to drop the adhesive on except the indicated position, especially on the AF cam surface ((D)).
2. Do not move or touch the ring for five minutes after application.

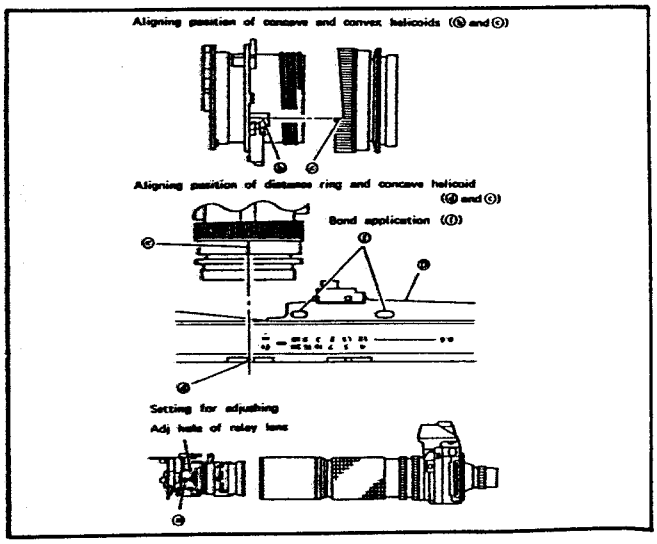


Fig. II-76

5. Electrical Adjustments (Camera Section)

* Notes: 1. For adjustments from 5-4 through 5-16, set the camera service mode.
2. Be sure to perform the data writing by pressing the REC key, after the data setting.

5-1 Clock frequency adjustment

M. EQ.	Frequency counter Note: Connect via an oscilloscope.
TP/TRIG.	C-MAIN C.B.A. TP1002 (SP2)
ADJ.	C-MAIN C.B.A. VC1001 (CLOCK)
SPEC.	4.828125 MHz ± 15 Hz

5-2 PLL adjustment

M. EQ.	Digital voltmeter
TP/TRIG.	C-MAIN C.B.A. TP1001 (PLL)
ADJ.	C-MAIN C.B.A. VC1002 (PLL)
SPEC.	2.5 ± 0.1 V

5-3 CCD RESET adjustment

CHART	Grayscale (5600°K)
MODE	Camera service mode (C1)
M. EQ.	Oscilloscope
TP/TRIG.	C-MAIN C.B.A. TP1101 (S/H OUT)/ TP1003 (FH/2)
ADJ.	CCD R
SPEC.	Maximize the waveform of TP1101 (S/H OUT) Note: If the waveform does not change, fix the data at 80.

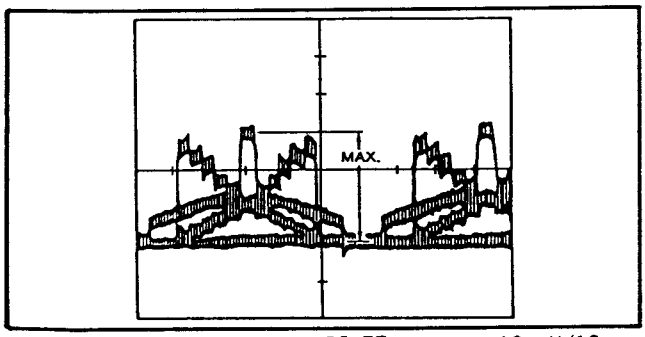


Fig. II-77 10 mV/10 µs

5-4 Auto iris adjustment

CHART	Grayscale (5600°K)
MODE	Camera service mode (C1)
M. EQ.	Oscilloscope
TP/TRIG.	C-MAIN C.B.A. TP1101 (S/H OUT)/ TP1103 (FH/2)
ADJ.	Y
SPEC.	300 ± 10 mV

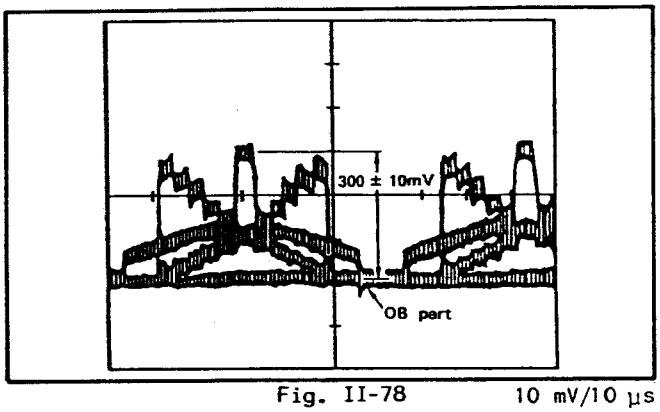


Fig. II-78 10 mV/10 µs

5-5 OB set adjustment

CHART	Lens capped
MODE	Camera service mode (C1)
M. EQ.	Oscilloscope
TP/TRIG.	C-MAIN C.B.A. TP1102 (YH)/ TP1003 (FH/2)
ADJ.	O. B
SPEC.	Center levels of waveform and blanking must be same. (0 ± 10 mV)

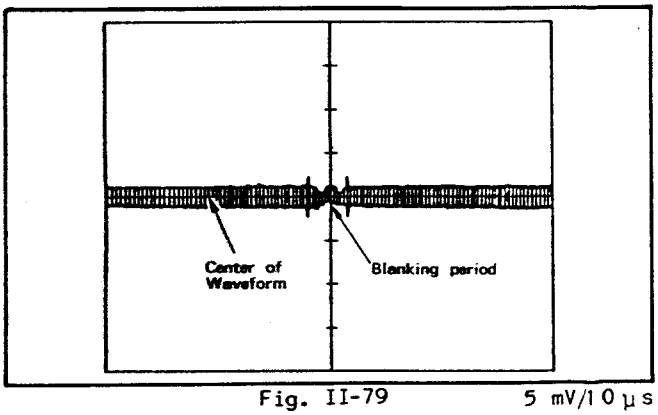


Fig. II-79 5 mV/10 µs

5-6 Y AGC adjustment

CHART	Grayscale (5600°K)
MODE	Camera service mode (C2)
M. EQ.	Oscilloscope
TP/TRIG.	C-MAIN C.B.A. TP1301 (VIDEO)/ TP1003 (FH/2)
ADJ.	AGC
SPEC.	350 ± 10 mV

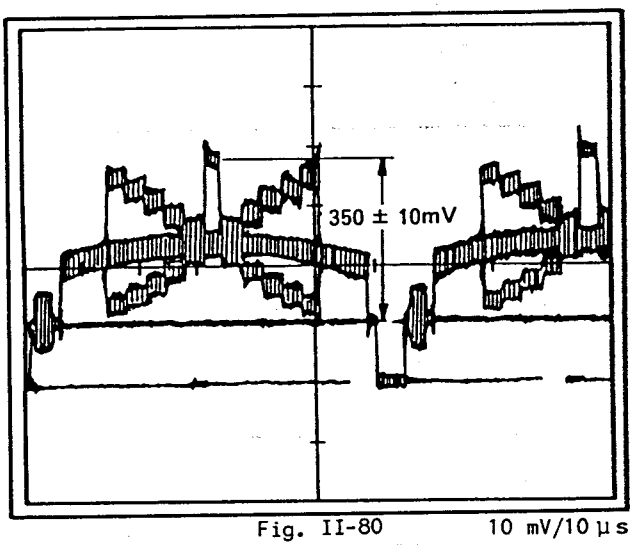


Fig. II-80 10 mV/10 µs

5-7 White clip adjustment

CHART	Window chart
MODE	Camera service mode (C5)
M. EQ.	Oscilloscope
TP/TRIG.	C-MAIN C.B.A. TP1301 (VIDEO)/ TP1003 (FH/2)
ADJ.	W. CLIP
SPEC.	400 ± 10 mV

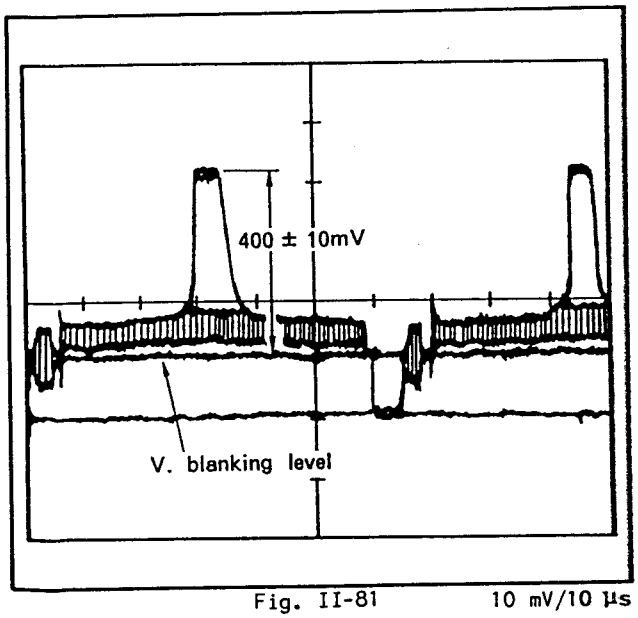


Fig. II-81 10 mV/10 µs

5-8 1/2 fH color difference adjustment

CHART	Lens capped
MODE	Camera service mode (C2)
M. EQ.	Oscilloscope
TP/TRIG.	C-MAIN C.B.A. TP1103 (C0H)/ TP1003 (FH/2)
ADJ.	FH/2
SPEC.	Difference of every 1H must be 0 ± 10 mV

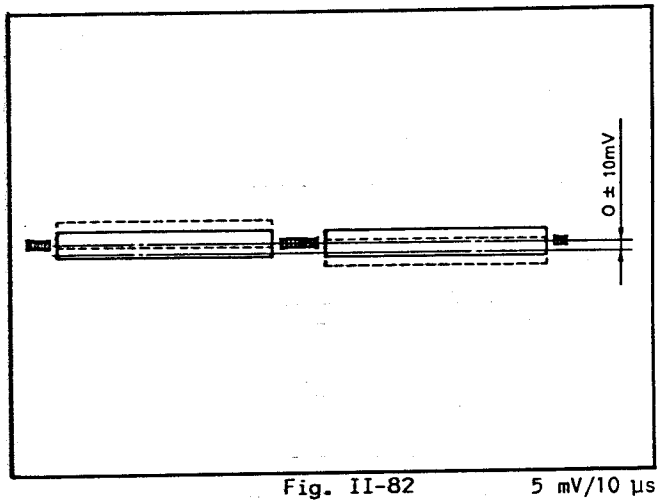


Fig. II-82 5 mV/10 µs

5-9 Chroma offset adjustment

CHART	Lens capped
MODE	Camera service mode (C2)
M. EQ.	Oscilloscope
TP/TRIG.	C-MAIN C.B.A. TP1103 (C0H)/ TP1003 (FH/2)
ADJ.	OFFSET
SPEC.	Difference between blanking and video signal must be 0 ± 10 mV.

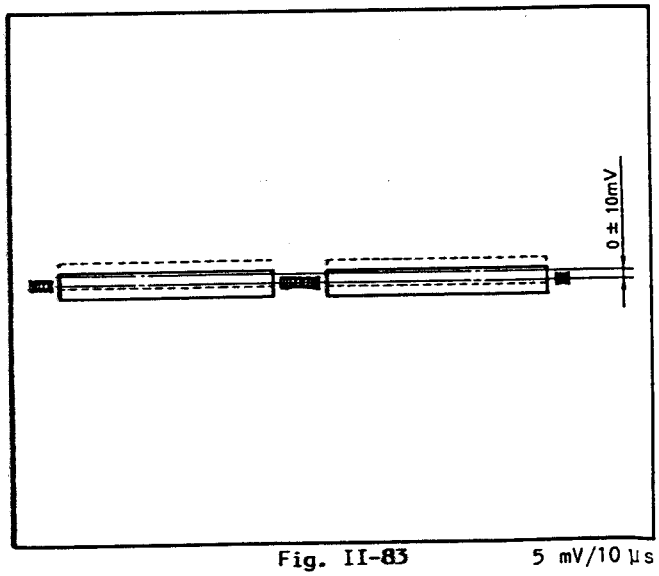


Fig. II-83 5 mV/10 µs

5-10 Carrier balance adjustment

CHART	Grayscale (see Fig. II-84) (5600°)
MODE	Camera service mode (C3)
M. EQ.	Vectorscope
ADJ.	BL R BL B
SPEC.	Bright dot (dark part) to be centered

* Notes: 1. Turn a zoom setting from the standard angle of view to a wide angle for the adjustment.
2. If two dots are appeared, choose a dot in the dark part.

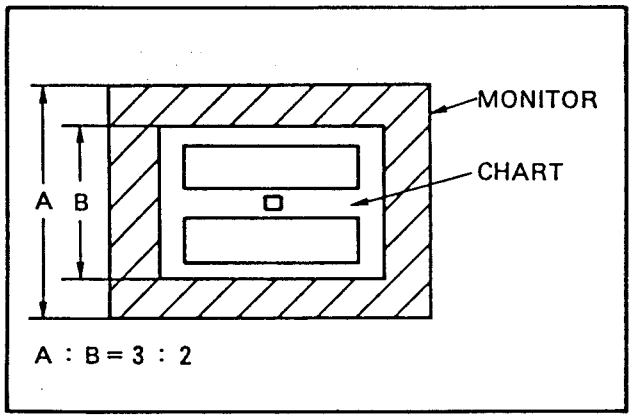


Fig. II-84

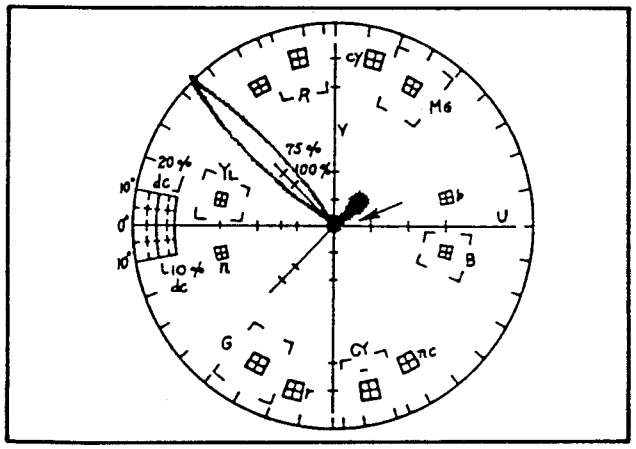


Fig. II-85

5-11 White balance adjustment

CHART	Grayscale (5600°K)
MODE	Camera service mode (C3)
M. EQ.	Vectorscope
TP/TRIG.	VIDEO OUT
ADJ.	WB R, WB B
SPEC.	Center the bright dot. (light part)

* Note: When writing by REC key, shoot the grayscale chart with a standard angle of view.

5-12 Color difference gain/modulation axis adjustment

CHART	Color bar (5600°K)
MODE	ADJ. MODE
M. EQ.	Vectorscope
ADJ.	C-MAIN C.B.A. VR1101 (C1H LEVEL) B PHASE C-MAIN C.B.A. VC1801(SC90)
SPEC.	° Overlay each bright dot Acceptable dot split: Phase 5° or less Gain 10% or less ° Burst phase: 135 ± 2°

* Note: Measure dot split according to Fig. II-86.

Procedures:
(1) Align each bright dot same. (VR1101, B PHASE).
(2) Make the length of burst level in every 1H same. (VC1301)

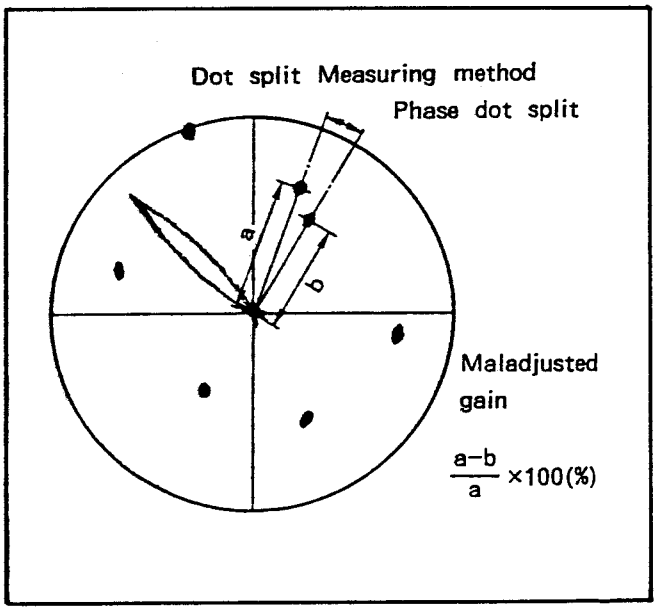


Fig. II-86

5-13 Color balance adjustment

CHART	Color bar (5600°K)
MODE	Camera service mode (C4)
M. EQ.	Vectorscope
TP/TRIG.	VIDEO OUT
ADJ.	C.GAIN R C.GAIN B
SPEC.	Color phase Gain R 106 ± 2° 1.5 ± 0.2 times Ye 166 ± 4° 1.0 ± 0.25 times G 240 ± 6°

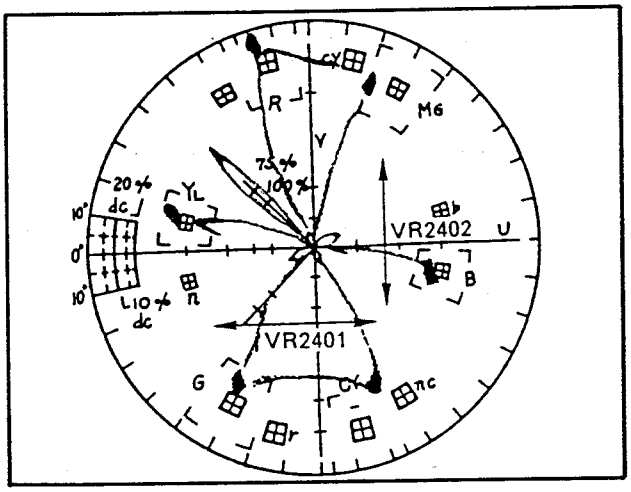


Fig. II-87

* Remarks: "Color balance check"

To check the color balance by using the complete product in normal mode, refer to the following ratings.
Before shooting the color bar chart (5600°K) at this check, lock the white balance by using a 5600°K light box.

	Color phase	Gain
R	108 ± 6°	1.25 ± 0.2 times
Ye	174 ± 8°	0.95 ± 0.25 times
G	248 ± 10°	-

5-14 FAWB adjustment

CHART	White chart (5600°K)
MODE	Camera service mode (C5)
M. EQ.	Vectorscope
TOOL	CCA12 filter (DY9-2046-000)
TP/TRIG.	VIDEO OUT
ADJ.	CCA1 CCA2
SPEC.	Automatically set to the rating by microcomputer

Procedures:

(1) Attach the CCA12 filter. Then, shoot the white chart of 5600°K (light box used).
(2) Set the CCA1 of C5 (service mode). Then, push the REC key.
(3) Set the CCA2, and push the REC key. Then the microcomputer automatically adjusts the FAWB to the rating.

* Remarks: "FAWB check"

To check the FAWB by using the complete product in normal mode, refer to the following rating.

Rating: Shoot the light box (5600°K) with CCA12 filter attached.
Under this conditions, the bright dot must be in the shadowed area indicated in the Fig. II-87-1. (Burst is on the circumference, r = 40 mm.)

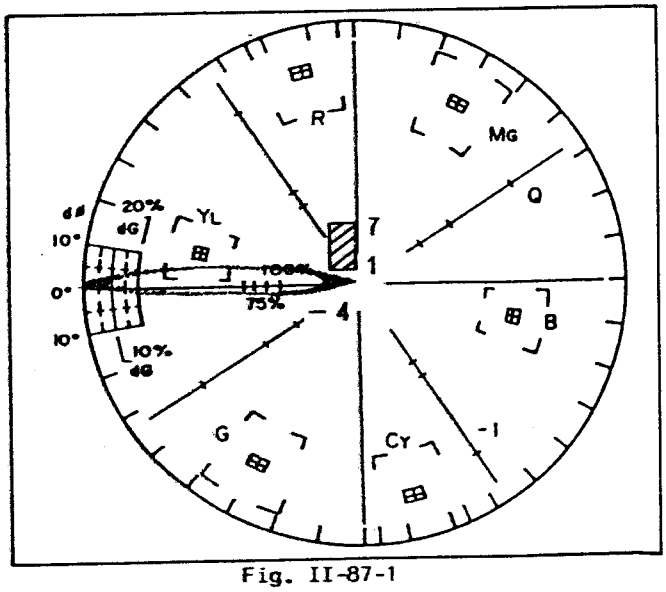


Fig. II-87-1

5-15 Blooming adjustment

* Notes: 1. Perform this adjustment only when the CCD is replaced. Before the PROCESS C.B.A. is replaced, measure the voltage at pin 10 of CCD (V SUB) in advnace. After mounting the new C.B.A., adjust the VR1001 to make the pin voltage same as that measured in advance.

2. If 300 mV cannot be obtained in the step (6), reduce the thickness of white paper to be attached on the rear side of U-pattern chart.

CHART	U-pattern chart (with white paper)
MODE	Iris opened Pin 3 of IC1101 ←→ TP1106 (5 V)
M. EQ.	Oscilloscope
TOOL	ND-2.0 filter (DY9-2044-000) Halogen lamp, White paper (thin one), Fixture (supplement of A1A's Service Manual)
TP/TRIG.	C-MAIN C.B.A. TP1101 (S/H OUT) TP1003 (FH/2)
ADJ.	C-MAIN C.B.A. VR1001 (V SUB)
SPEC.	Suppress blooming.

Procedures:

(1) Open the iris. Pin 3 of IC1101 ←→ TP1106.

(2) Attach the ND-2.0 filter on the front face of lens with the fixture. (Supplement for A1A's Service Manual)

(3) prepare a U-pattern chart with a white paper attached on its rear side.

(4) Make setting as shown in the Fig. II-88.

(5) Shoot the U-pattern chart with the standard angle of view.

(6) Locate the halogen lamp so that the signal level at TP1101 becomes 300 mV. Also, adjust the angle of halogen light so that the waveform in the Fig. II-89 is obtained.

(7) Remove the ND-2.0 filter and observe the monitor TV. (Fig. II-90)

(8) Adjust to a point where the blooming is begun to be suppressed by VR1101.

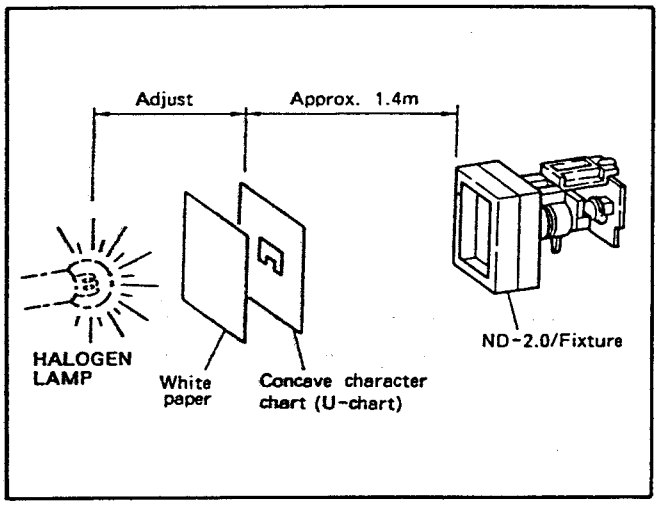


Fig. II-88

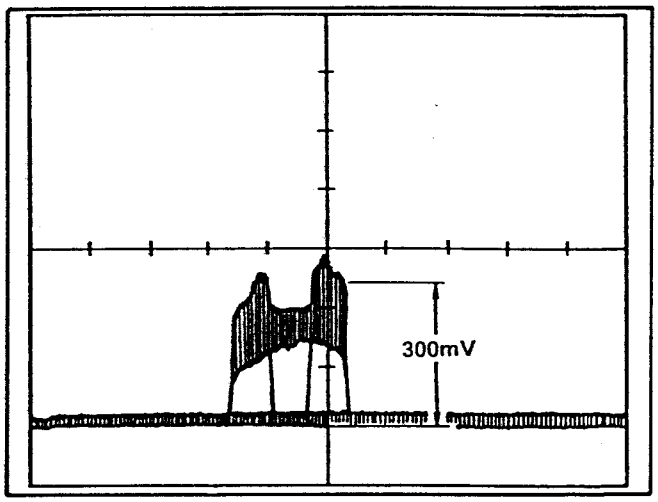


Fig. II-89

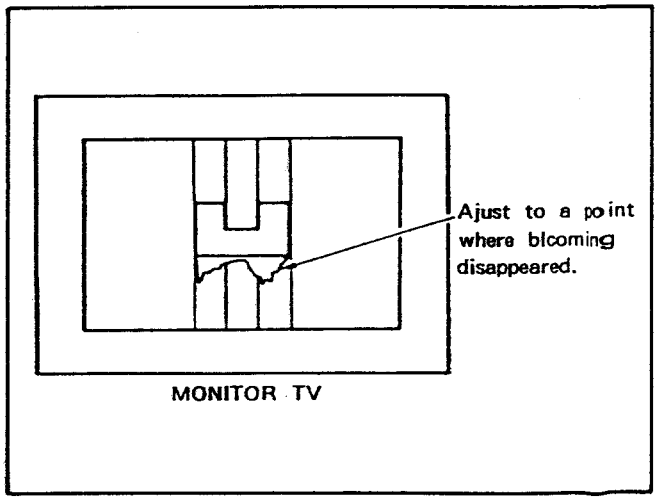
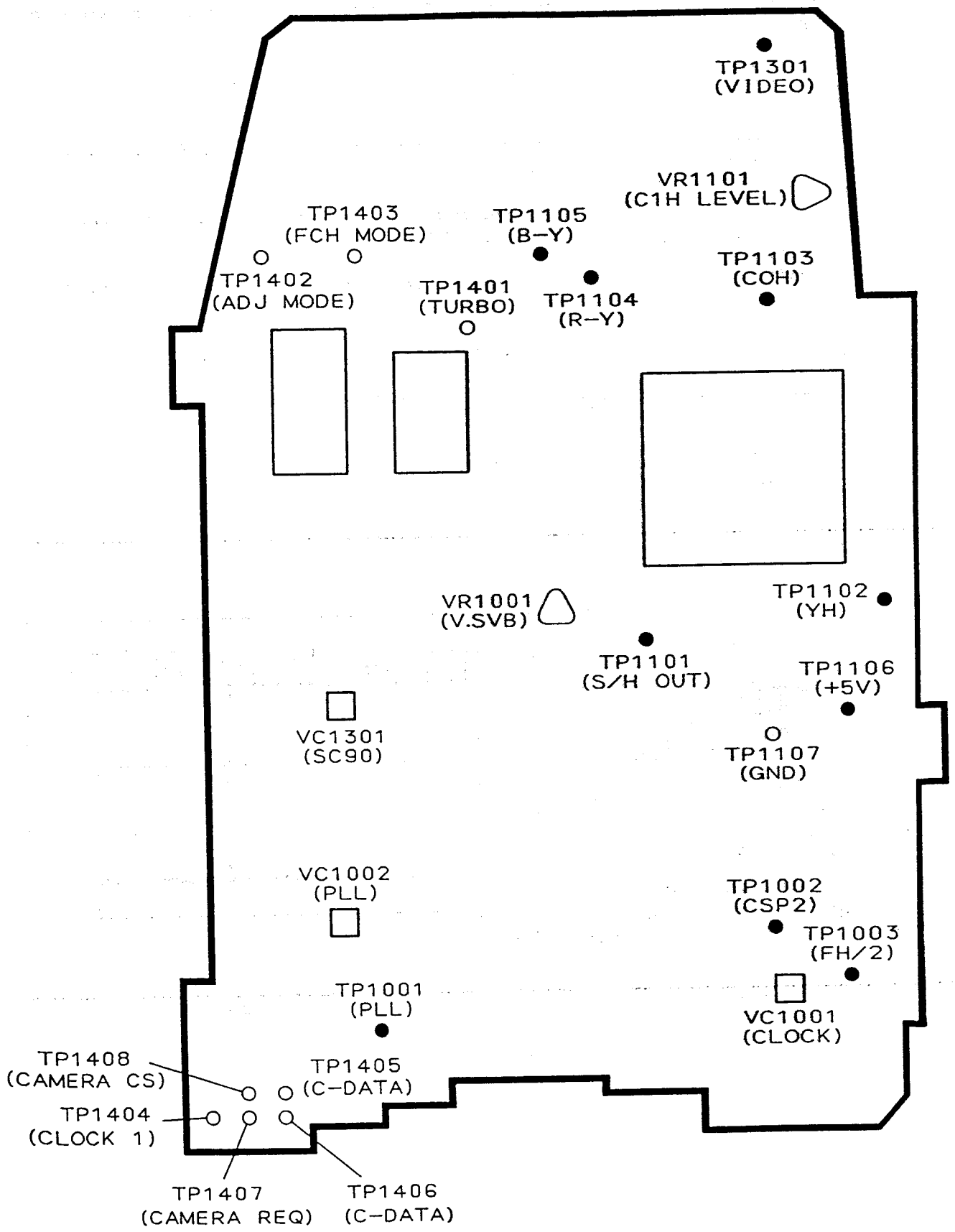


Fig. II-90

Locations of TP/VR/VC

CAMERA-MAIN C.B.A.



6. Electrical Adjustments of Recorder Section

* Notes: 1. The data which adjusted at 6-1 and 6-3 are written into the E^2PROM in the camera microcomputer IC1406. When the C-MAIN C.B.A. or the IC1406 is replaced, perform there adjustments.

2. For the adjustments to be performed in REC, EE mode, supply the video signal as follows.

(1) Connect the VIDEO OUT terminal of Pattern Generator with the INPUT terminal of Y/C Separator (DY9-1093-500).

Then, connect the OUTPUT connector of Y/C Separator with the CN101 of R-MAIN C.B.A. using the INPUT cable (DY9-1121-000).

(2) Supply the 5V to the Y/C Spearator from the Constant Voltage Supplier, and set the Y/C select switch to Y.

(3) Observe the signal waveform at pin 1 of CN101 (R-MAIN C.B.A.).

(4) Adjust the VR202 of Y/C Separator so that the DC voltage level of sync tip becomes 2.6 V.

(5) Turn the output level volume of Pattern Generator so that the peak-peak level becomes 500 mV.

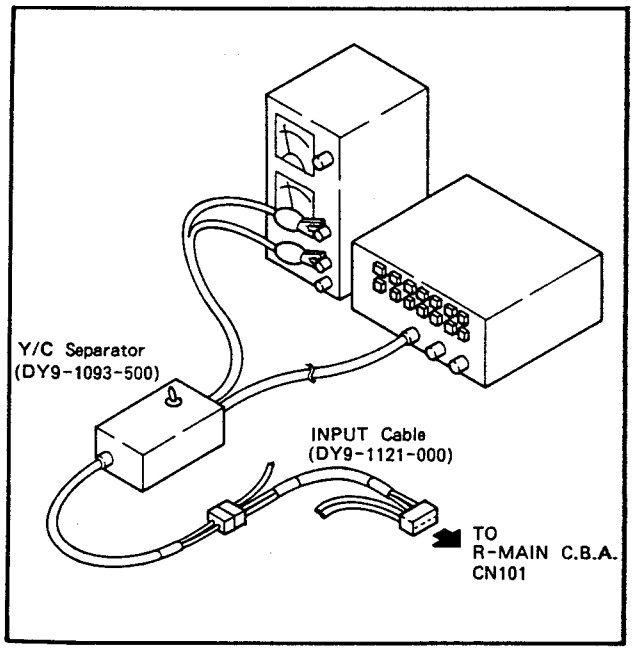


Fig. II-90-1

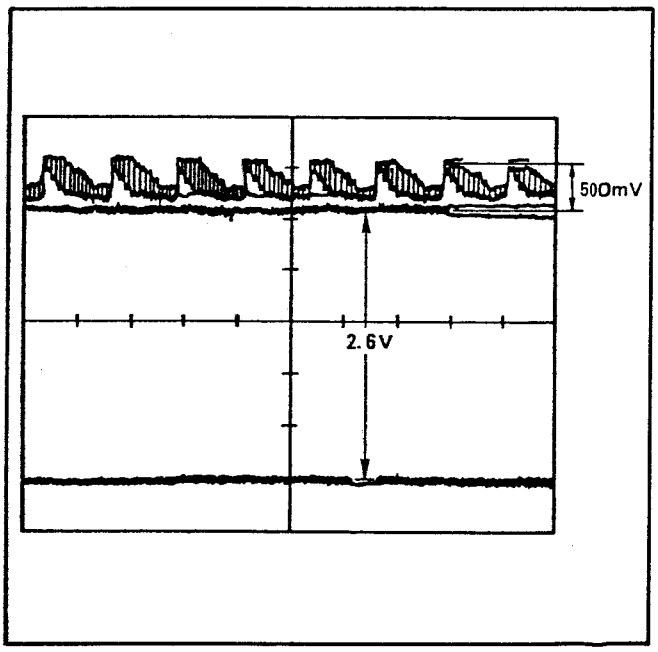


Fig. II-90-2

6-1 Setting of equipment type

MODE	Recorder service mode (R1), EE
ADJ.	TYPE
SPEC.	Upper bit U = USA, P = PAL J = JAPAN, S = F-PAL Lower bit 3

Procedures:

(1) Set the TYPE of R1 (Recorder service mode).

(2) Adjust the upper and lower bits according to the type of equipment.

(3) Push the REC key to write the data.

6-2 SS5V adjustment

MODE	EE
M. EQ.	Digital voltmeter
TP/TRIG.	R-MAIN C.B.A. TP409 (SS5V)
ADJ.	R-MAIN C.B.A. VR402 (SS5V)
SPEC.	5.1 ± 0.05 V

6-3 Undercut adjustment

MODE	Recorder service mode (R1), EE
M. EQ.	Digital voltmeter
ADJ.	B ADJ
SPEC.	5.67 ± 0.05 V

Procedures:

(1) Supply the 6 V to the battery terminal of complete unit, and turn on the power switch.

(2) Set the B ADJ of R1 (Recorder service mode).

(3) Set the voltage at battery terminal to 5.67 V.
Then, by pushing the REC key, the voltage is written by the microcomputer as the reference voltage for the detection of insufficient power voltage.

6-4 Switching point adjustment

SIGNAL	Color bar (REC/PB)
MODE	PB
TP/TRIG.	R-MAIN C.B.A. Card edge connector, pin 8 (HSW), VIDEO OUT
ADJ.	R-MAIN C.B.A. VR401 (PG DL)
SPEC.	6.0 ± 1 H

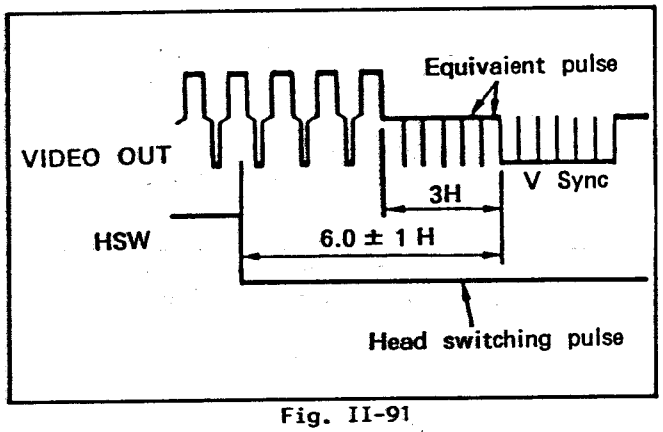


Fig. II-91

6-5 AV5V adjustment

MODE	REC
M. EQ.	Digital voltmeter
TP/TRIG.	R-MAIN C.B.A. IC102, pin 8 (AV5V)
ADJ.	R-MAIN C.B.A. VR105 (AV5V)
SPEC.	5.1 ± 0.05 V

6-6 Y/C separation adjustment

SIGNAL	Color bar signal
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	R-MAIN C.B.A. IC104, pin 25
ADJ.	R-MAIN C.B.A. VR109 (Y/C SEP)
SPEC.	Minimize the residual chrominance component.

Procedures:

(1) Connect the pin 39 of IC104 (R-MASIN C.B.A.) to ground via a 10 µF/16 V capacitor.

(2) Minimize the residual chrominance component by turning the VR109 (R-MAIN C.B.A.)

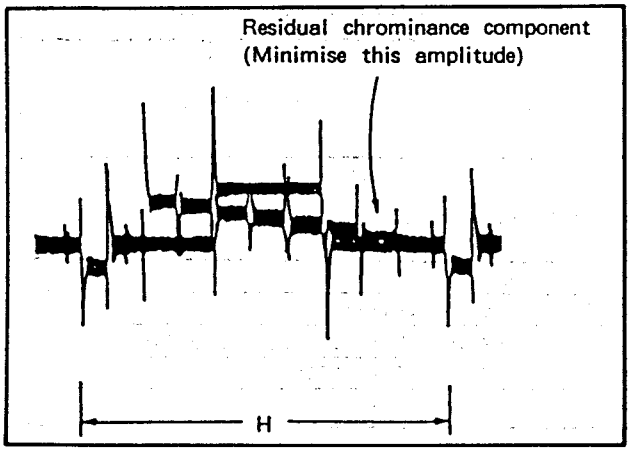


Fig. II-93

6-7 Video level adjustment

SIGNAL	Color bar signal
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	R-MAIN C.B.A. IC104, pin 30
ADJ.	R-MAIN C.B.A. VR108 (Y LEVEL)
SPEC.	500 ± 10 mVp-p

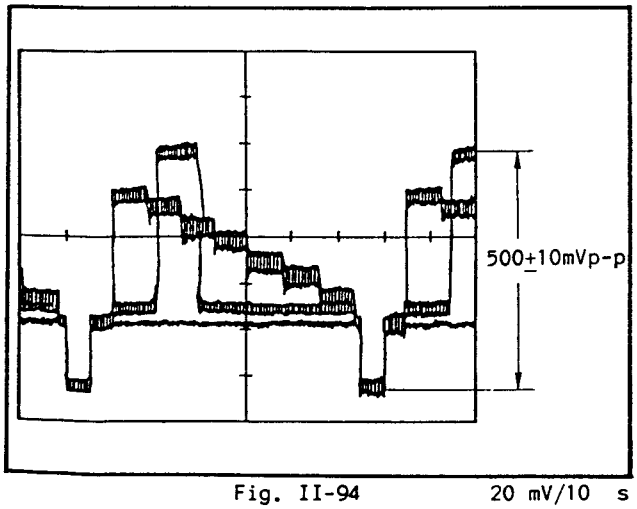


Fig. II-94 20 mV/10 s

6-8 Y FM carrier adjustment

SIGNAL	No signal (Terminal-opened)
MODE	REC
M. EQ.	Frequency counter (Connect via an oscilloscope.)
TP/TRIG.	R-MAIN C.B.A., Emitter Q114
ADJ.	R-MAIN C.B.A. VR106 (Y CAR.)
SPEC.	4.38 ± 0.04 MHz

6-9 Y FM deviation adjustment

* Note: Use a signal waveform having the shortest cycle.

SIGNAL	100% white
M. EQ.	Oscilloscope
TP/TRIG.	R-MAIN C.B.A., Emitter Q114
ADJ.	R-MAIN C.B.A. VR107 (Y DEV.)
SPEC.	0.37 µsec/2 cycle (5.4 MHz)

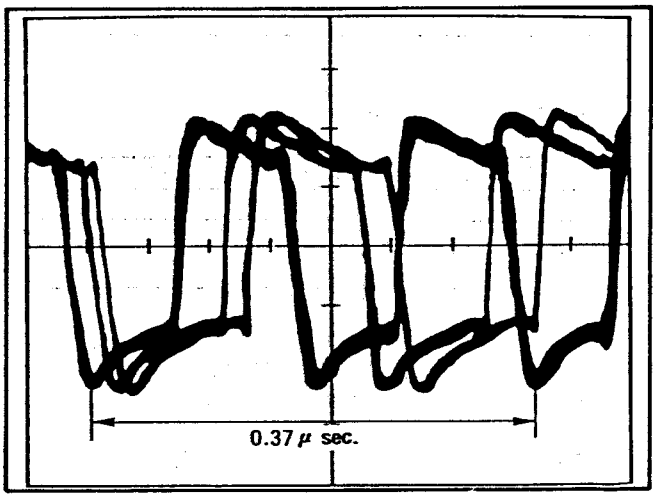


Fig. II-95

6-10 FM audio carrier adjustment

SIGNAL	No signal (Terminal-opened)
MODE	EE
M. EQ.	Frequency counter (Connect via an oscilloscope.)
TP/TRIG.	AV C.B.A. TP Ⓐ
ADJ.	AV C.B.A. VR502 (A CAR.)
SPEC.	1.5 ± 0.02 MHz

6-11 FM audio deviation adjustment

SIGNAL	Monosco master (DY9-1062-000)
MODE	PB
M. EQ.	Oscilloscope
TP/TRIG.	AV C.B.A. PIN JACK (AUDIO OUT)
ADJ.	AV C.B.A. VR501 (A DEV.)
SPEC.	1000 ± 50 mVp-p

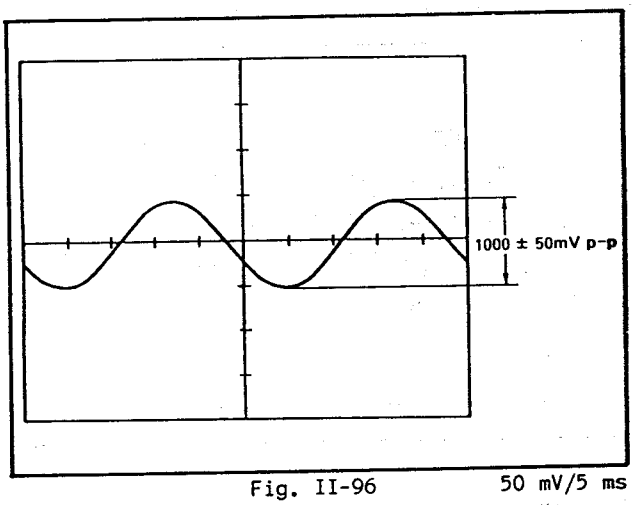


Fig. II-96 50 mV/5 ms

6-12 REC Y level adjustment

SIGNAL	No signal
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	R-MAIN C.B.A. TP Ⓑ
ADJ.	R-MAIN C.B.A. VR103 (REC Y)
SPEC.	250 ± 10 mV

* Note: Appearing waveform includes the other signal or the noise. For adjustment, measure the value of waveform's center.

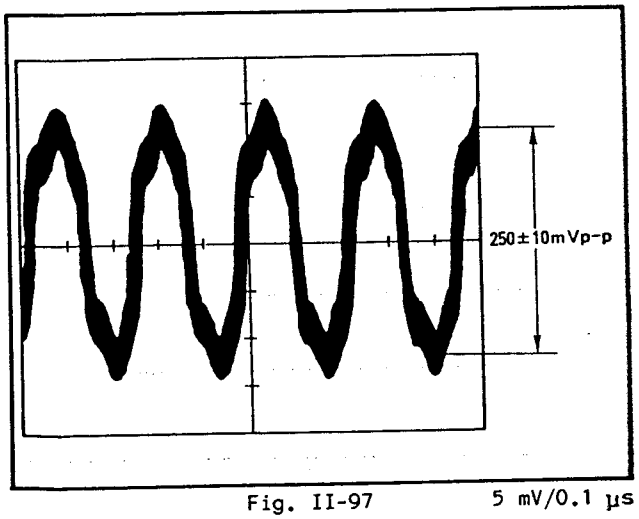


Fig. II-97 5 mV/0.1 µs

6-13 REC C level adjustment

SIGNAL	Color bar signal
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	R-MAIN C.B.A. TP Ⓑ
ADJ.	R-MAIN C.B.A. VR801 (REC C)
SPEC.	59 ± 3 mVp-p

Procedures:

(1) Connect the base of Q108 (REC Y), Ⓒ of VR702 (REC ATF) and Ⓓ of VR251 (REC A-FM) to ground.

(2) Adjust the waveform of burst signal to the rating.

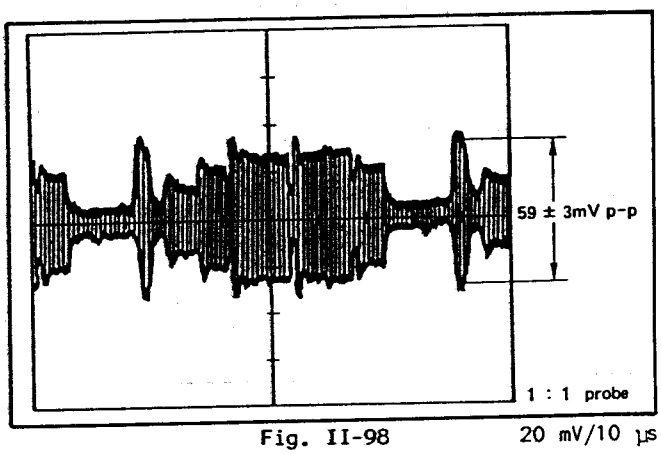


Fig. II-98 20 mV/10 µs

6-14 REC A-FM level adjustment

SIGNAL	No signal
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	R-MAIN C.B.A. TP Ⓑ
ADJ.	R-MAIN C.B.A. VR251 (REC A-FM)
SPEC.	13 ± 1 mVp-p

Procedures:

(1) Connect the base of Q108 (REC Y) and the Ⓒ of VR702 (REC-ATF) to ground.

(2) Adjust the waveform to the rating.

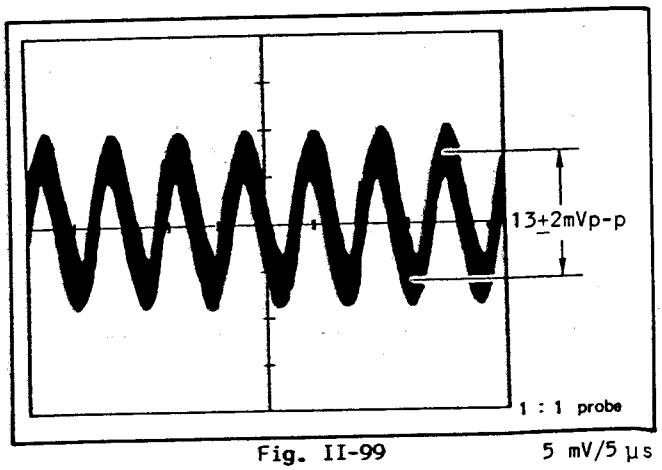


Fig. II-99 5 mV/5 µs

6-15 REC ATF level adjustment

SIGNAL	No signal
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	R-MAIN C.B.A. TP Ⓑ
ADJ.	R-MAIN C.B.A. VR702 (REC ATF)
SPEC.	12 ± 1 mVp-p

Procedures:

(1) Connect the base of Q108 (REC Y) and the Ⓓ of VR251 (REC A-FM) to ground.

(2) Adjust the waveform having longest period (among four frequencies) to the rating.

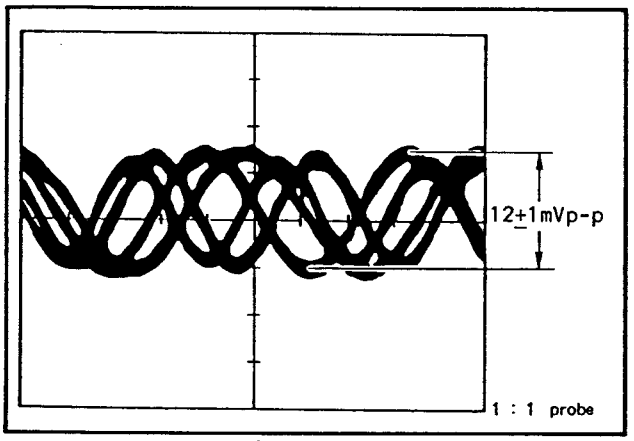


Fig. II-100 5 mV/2 µs

6-16 PB Y level adjustment

SIGNAL	Color bar master (REC/PB)
MODE	PB
M. EQ.	Oscilloscope
TP/TRIG.	R-MAIN C.B.A. IC104, pin 47
ADJ.	R-MAIN C.B.A. VR111 (PB Y LEVEL)
SPEC.	500 ± 10 mVp-p

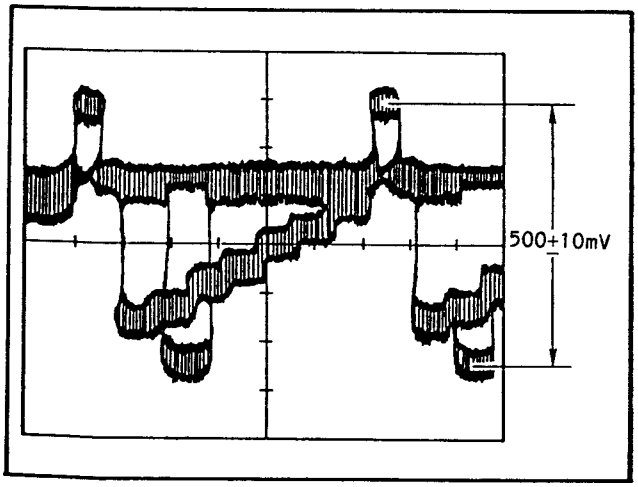


Fig. II-101 10 mV/10 µs

6-17 JOG chrominance phase adjustment

SIGNAL	Color bar master (REC/PB)
MODE	PB
M. EQ.	Oscilloscope
TP/TRIG.	Video output terminal (75Ω terminated)
ADJ.	R-MAIN C.B.A. VR110 (PB AGC)
SPEC.	1.00 ± 0.05 Vp-p

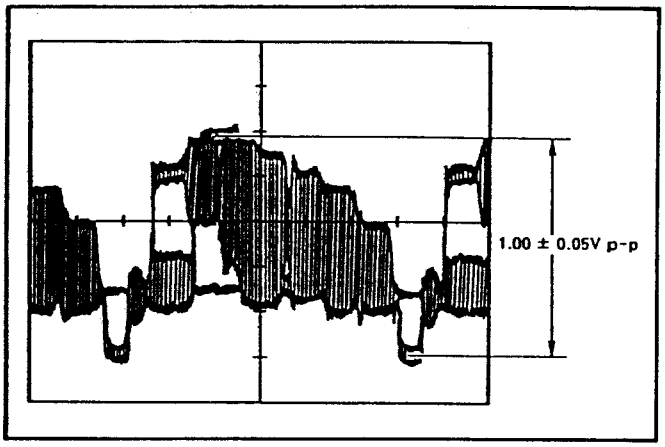


Fig. II-102 20 mV/10 µs

6-18 Character position of character generator adjustment

* Note: Make characters display by using a wireless remote controller.

SIGNAL	Color bar master (REC/PB)
MODE	EE
M. EQ.	Monitor TV
TP/TRIG.	C-KEY C.B.A. VC2001 (CG CLOCK)
SPEC.	The border between blue and black must be in the middle of rightmost digit and the second digit.

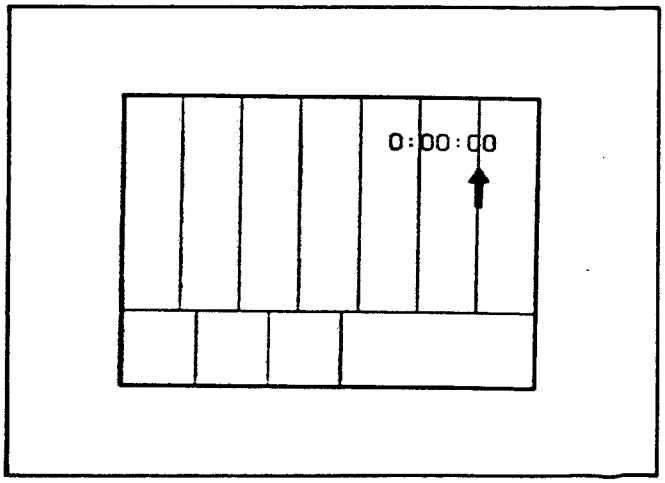
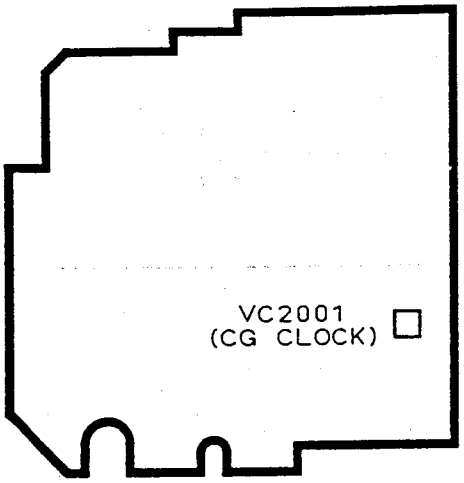


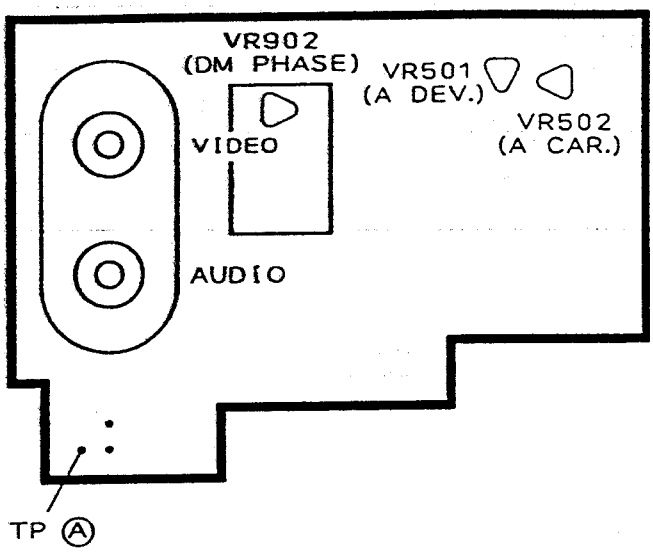
Fig. II-103

Locations of TP/VR/VC

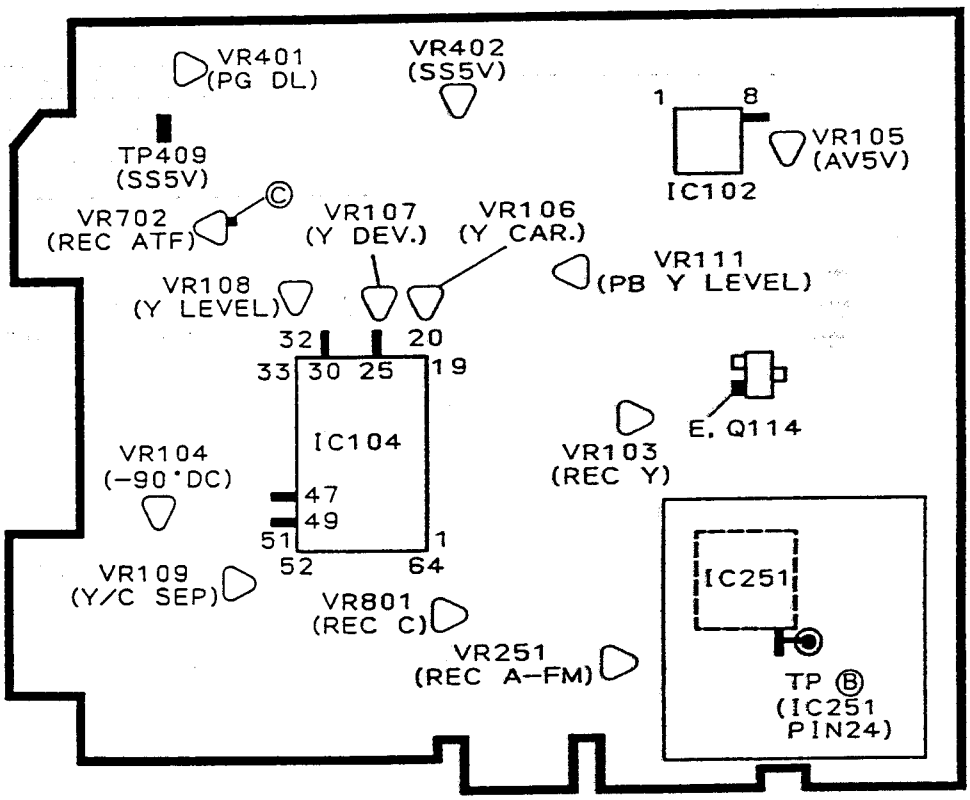
CAMERA-KEY C.B.A.



AUDIO-VIDEO C.B.A.



RECORDER-MAIN C.B.A.



7. Electrical Adjustment of EVF

7-1 Vertical amplitude adjustment

SIGNAL	Circle (round) subject
MODE	EE
M. EQ.	EVF, Monitor TV
ADJ.	GRIP C.B.A. VR2901 (V-SIZE)
SPEC.	Free from distortion. Absence of incongruity in comparison with monitor TV screen.

Procedures:

(1) Shoot a figure of circle fully in the screen.

(2) Adjust the VR2901 so that there is no incongruity in comparison with the monitor TV screen.

7-2 Rotation and centering adjustment

MODE	EE
M. EQ.	Oscilloscope
ADJ.	Deflection yoke, Centering magnet
SPEC.	Screen is not tilted and is located right at the center.

Procedures:

(1) Choose a subject for judgement of centering and tilting. Then shoot it.

(2) Loosen the fastening ring to turn the deflection yoke.

(3) Turn the deflection yoke to correct the tilting of subject.

* Note: Move the deflection yoke completely toward the CRT screen.

(4) Tighten the fastening ring.

* Note: The fastening ring must be tightened so that the centering magnet can still be moved.

(5) Adjust the centering magnet so as to locate the subject image at the center.

(6) Tighten the fastening ring completely.

(7) Fix the centering magnet by applying paint or the like (at 180° interval, 2 points).

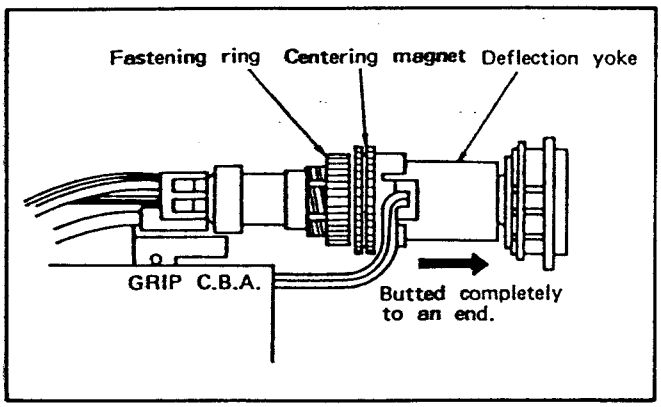


Fig. II-104

7-3 Brightness adjustment

SIGNAL	Self-record/playback tape (grayscale)
MODE	PLAY
M. EQ.	EVF
ADJ.	GRIP C.B.A. VR2904 (BRIGHT)
SPEC.	Distinguishable down to 11th step of grayscale

7-4 Focus adjustment

MODE	Lens-capped (character indication)
M. EQ.	EVF
ADJ.	GRIP C.B.A. VR2903 (FOCUS)
SPEC.	EVF character under optimum focus

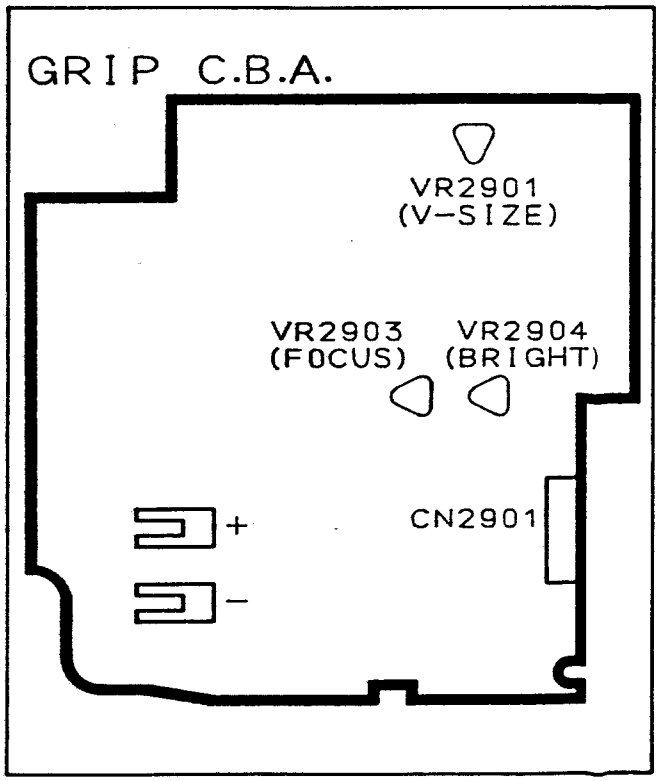


Fig. II-105

8. Mechanical Adjustments of Recorder Section

For mechanical adjustment and disassembling procedures, refer to the service manual for MC-4B (DY8-3381-501 201).
The additional adjustments only are explained hereafter.

8-1 Tape transport adjustment

Under the basic setting conditions, set the recorder service mode R2 or R3.

Then, take out the PB-RF and SWP by using the extension cable q.

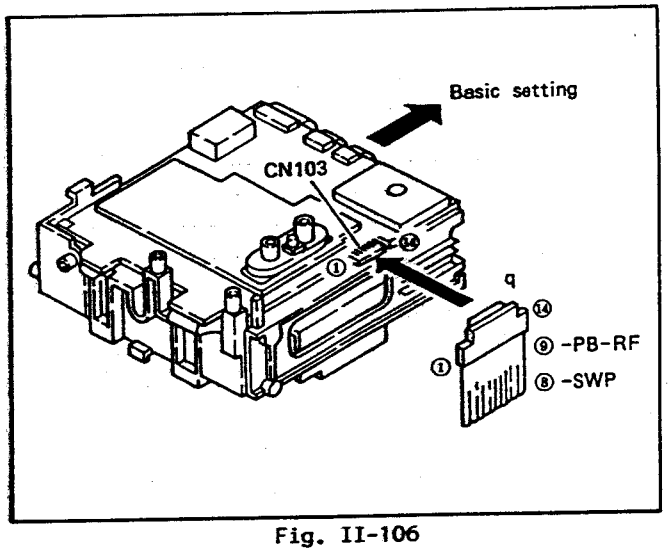


Fig. II-106

8-2 How to drive loading motor

To operate the loading motor independently, apply the power directly. (Fig. II-107)

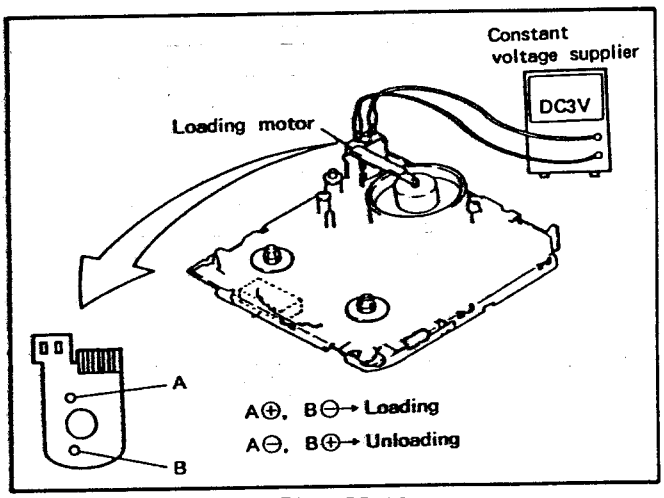


Fig. II-107

8-3 Replacement of upper drum

Refer to the Service Manual for the MC-4B.
(Replacement of upper drum, 3-20)

* Parts ⓐ in the Fig. II-108 are plug-in type. (Not soldered as in the conventional models)

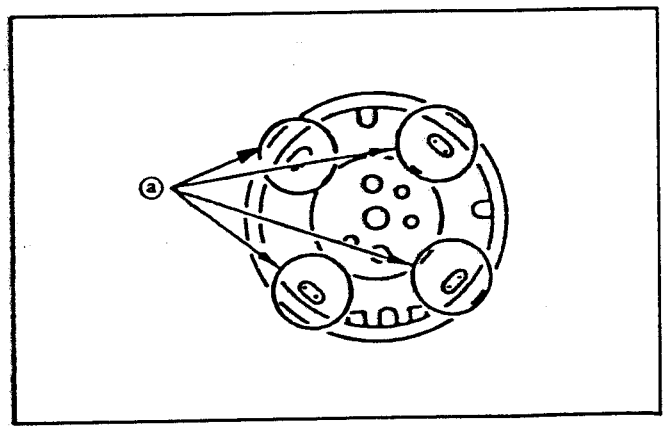


Fig. II-108

9. Adjustment · Checkings After Replacement

The following table shows the minimal adjustments · checkings required after the parts replacement.

● : Adjustments Δ : Checkings

No.	Adjustments	Replaced parts									
		CCD	C-MAIN C.B.A.	C-KEY C.B.A.	R-MAIN C.B.A.	AV C.B.A.	DM C.B.A.	GRIP C.B.A.	CAMERA Mi-Com.	MAIN Mi-Com.	SERVO Mi-Com.
5-1	Clock frequency adjustment		Δ								
5-2	PLL adjustment		Δ								
5-3	CCD reset adjustment	●	●						●		
5-4	Auto iris adjustment	●	●						●		
5-5	OB set adjustment	●	●						●		
5-6	Y AGC adjustment	●	●						●		
5-7	White clip adjustment	●	●						●		
5-8	1/2 fH color difference adjustment	●	●						●		
5-9	Chroma offset adjustment	●	●						●		
5-10	Carrier balance adjustment	●	●						●		
5-11	White balance adjustment	●	●						●		
5-12	Modulation axes adjustment	●	●						●		
5-13	Color balance adjustment	●	●						●		
5-14	FAWB adjustment	●	●						●		
5-15	Blooming adjustment	●	●								
6-1	Setting of equipment type adjustment		●						●		
6-2	SS5V adjustment				Δ						
6-3	Undercut adjustment		●		●				●		●
6-4	Switching point adjustment				●						●
6-5	AV5V adjustment				Δ						
6-6	YC separation adjustment				Δ						
6-7	Video level adjustment				Δ						
6-8	Y FM carrier adjustment				Δ						
6-9	Y FM deviation adjustment				Δ						
6-10	FM audio carrier adjustment					Δ					
6-11	FM audio deviation adjustment					Δ					
6-12	REC Y level adjustment				Δ						
6-13	REC C level adjustment				Δ						
6-14	REC A-FM level adjustment				Δ						
6-15	REC ATF level adjustment				Δ						
6-16	PB Y level adjustment				Δ						
6-17	JOG chrominance phase adjustment				Δ						
6-18	Character position of character generator adjsutment			Δ							

(Continued to next page.)

● : Adjustments Δ : Checkings

No.	Adjustments	Replaced parts									
		CCD	C-MAIN C.B.A.	C-KEY C.B.A.	R-MAIN C.B.A.	AV C.B.A.	DM C.B.A.	GRIP C.B.A.	CAMERA Mi-Com.	MAIN Mi-Com.	SERVO Mi-Com.
7-1	Vertical amplitude adjustment							Δ			
7-2	Rotation and centering adjustment							●			
7-3	Brightness adjustment							●			
7-4	Focus adjustment							●			

CONTENTS

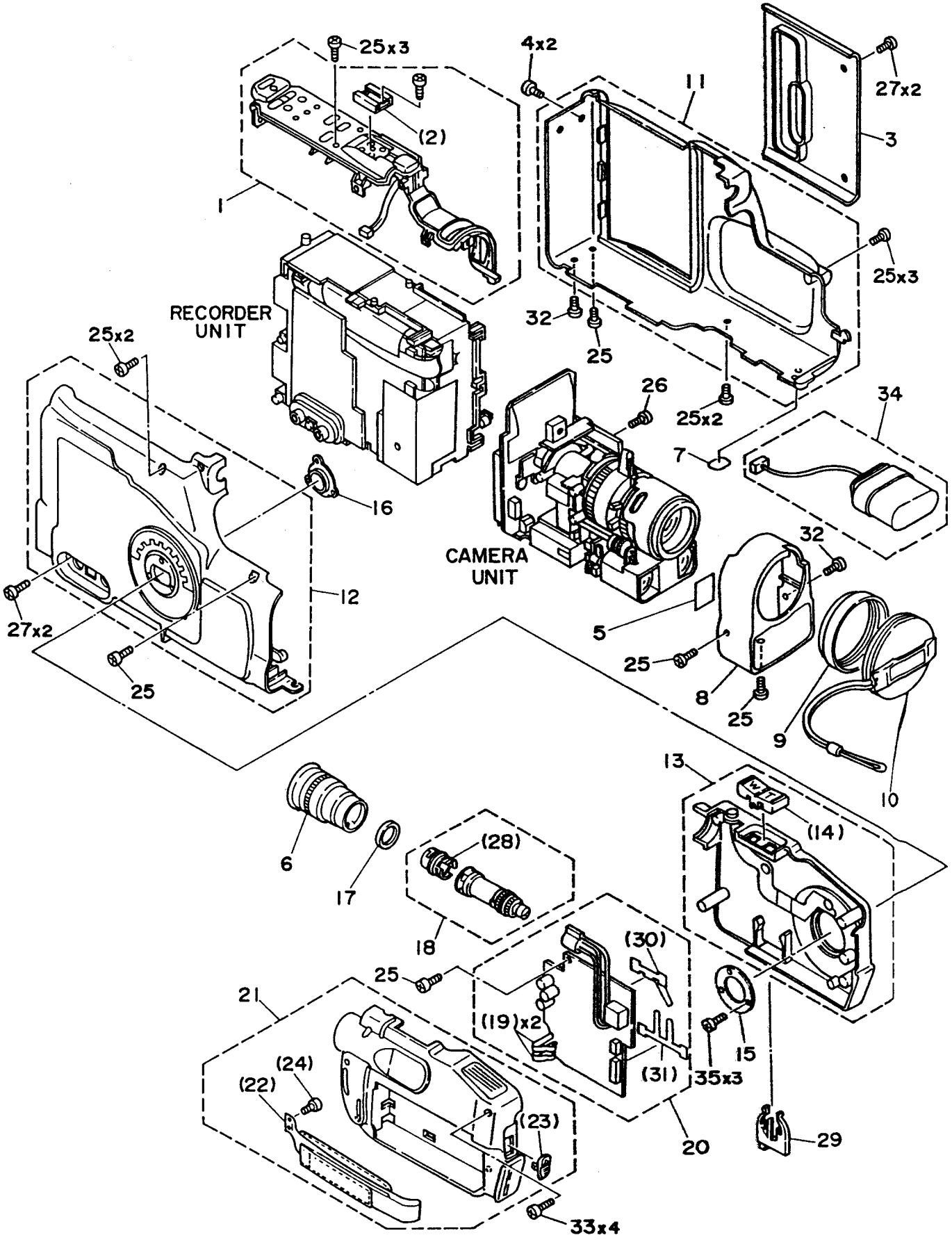
CAUTION

1. ESPECIALLY CRITICAL PARTS IN THE POWER CIRCUIT BLOCK SHOULD NOT BE REPLACED WITH OTHER MARKS.
   CRITICAL PARTS ARE MARKED WITH ⚠ IN THIS ELECTRICAL PARTS LIST.

2. THE NUMBERS INDICATED ON THE CONNECTORS DO NOT CORRESPOND TO THE SYMBOL NUMBERS.
   PLEASE CHECK THE CORRECT SYMBOL NUMBERS OF THE CONNECTORS ON THE INTERCONNECTION SCHEMATIC DIAGRAM.

3. THE PARTS SHADOWED (▒) DENOTE THE F-PAL USE.
   (THE UNSHADOWED ARE FOR THE PAL SYSTEM.)

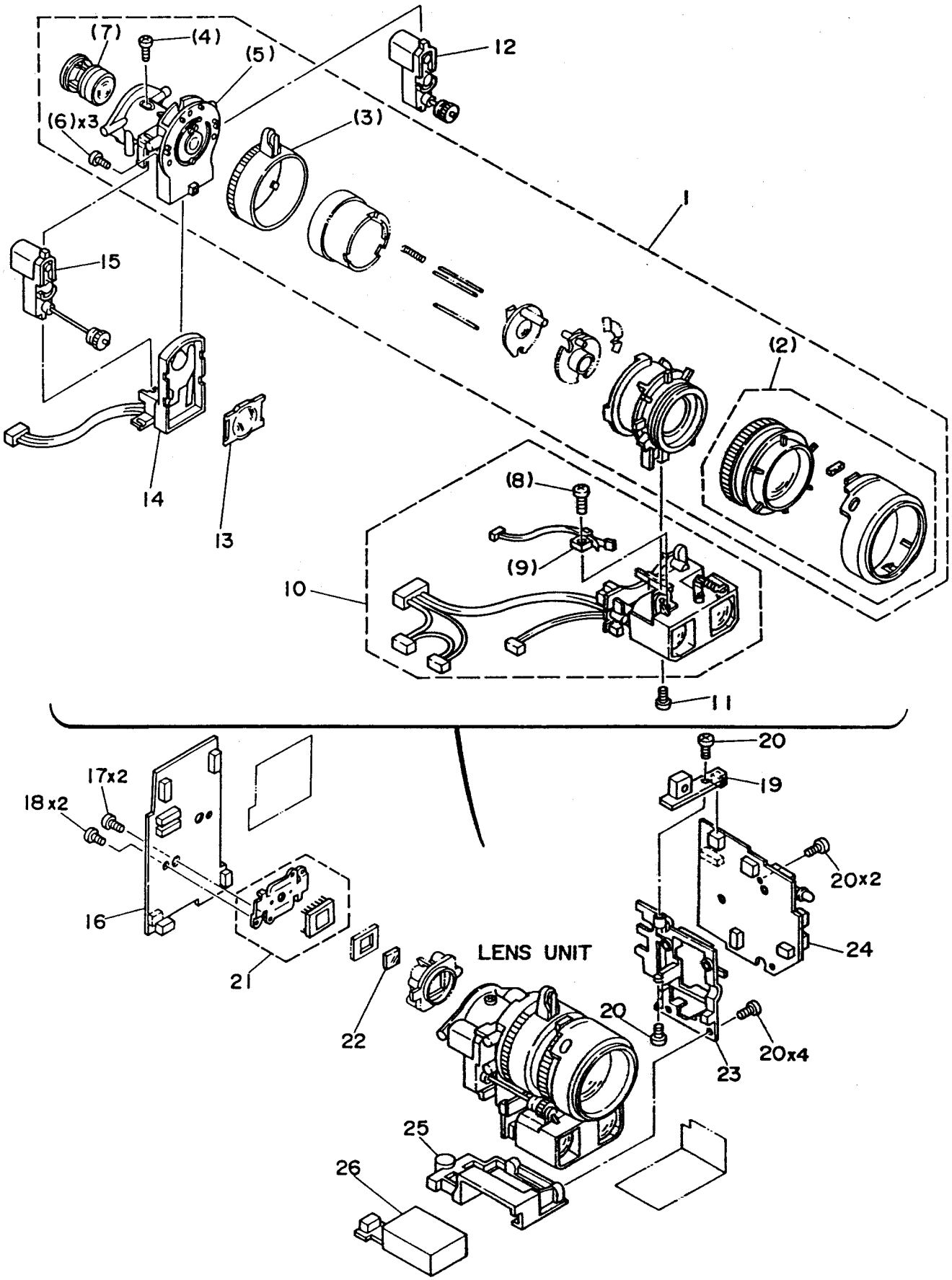
Casing Parts Section



MECHANICAL PARTS

SYMBOL		PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	1	DG1-1933-000 000	B	1	TOP COVER ASS'Y	VCC830 ONLY
		DG1-1725-000 000	B	1	TOP COVER ASS'Y	E60F ONLY
	2	DA1-4403-000 000	B	1	SHOE, ACCESORY	
	3	DF1-1155-001 000	B	1	COVER, CASSETTE	
	4	DA1-4571-000 000	F	2	SCREW, CROSS-RECESS	
	5	DA1-5438-000 000	C	1	SHEET, AF BLOCK	
	6	DY2-1223-000 000	B	1	SPORTS FINDER SF-200	
	7	DA1-4586-000 000	C	1	SEAL	
	8	DG1-1930-000 000	B	1	LENS COVER ASS'Y	
	9	DA1-5437-000 000	B	1	HOOD	
	10	DY1-5025-000 000	B	1	CAP, LENS	
	11	DG1-1932-000 000	B	1	RIGHT COVER ASS'Y	VCC830 ONLY
		DG1-1712-000 000	B	1	RIGHT COVER ASS'Y	E60F ONLY
	12	DY2-1376-000 000	B	1	LEFT COVER ASS'Y	
	13	DY2-1374-000 000	B	1	RIGHT COVER, GRIP	
	14	DA1-4524-000 000	B	1	KNOB, TELE/WIDE	
	15	DA1-3985-000 000	C	1	PLATE(1), GRIP	
	16	DA1-3986-000 000	C	1	PLATE(2), GRIP	
	17	DA1-4240-000 000	B	1	RING, CRT RUBBER	
⚠	18	DY2-1375-000 000	D	1	CRT ASS'Y	
	19	DA1-4520-000 000	C	2	TERMINAL, BATTERY	
⚠	20	DG1-1617-000 000	C	1	GRIP C.B.A.	
	21	DG1-1926-000 000	B	1	LEFT COVER, GRIP	
	22	DA1-5242-000 000	B	1	STRAP, HAND	
	23	DA1-1857-000 000	B	1	KNOB, BATTERY EJECT	
	24	XA9-0435-000 000	F	1	SCREW, CROSS-RECESS, PH	
	25	XA4-9200-409 000	F	15	SCREW, CROSS-RECESS, PH	
	26	DA1-4534-000 000	F	1	SCREW, CROSS-RECESS	
	27	XA1-7200-409 000	F	4	SCREW, CROSS-RECESS, PH	
	28	DA1-4751-000 000	C	1	MASK, CRT	
	29	DA1-4523-000 000	B	1	COVER, BATTERY	
	30	DA1-3979-000 000	C	1	TERMINAL,(1)	
	31	DA1-3980-000 000	C	1	TERMINAL,(2)	
	32	XA4-9200-509 000	F	2	SCREW, CROSS-RECESS, PH	
	33	XA4-9260-709 000	F	4	SCREW, CROSS-RECESS, PH	
	34	DH9-0520-000 000	C	1	MICROPHONE ASS'Y	
	35	XA9-0521-000 000	F	3	SCREW, CROSS-RECESS	

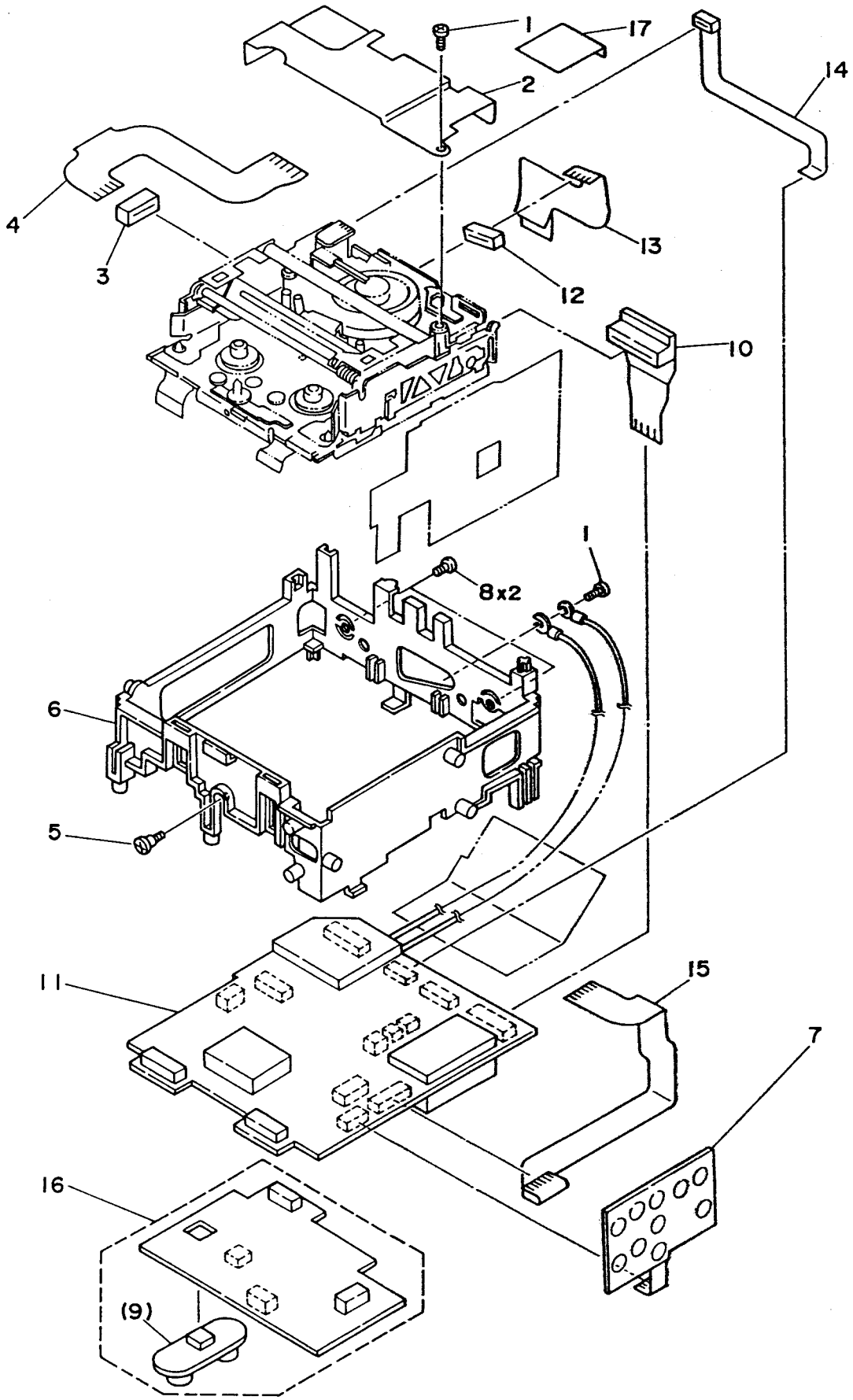
Lens Camera Unit Section



MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY1-7177-000 000	C	1	ZOOM LENS ASS'Y	
2	DY1-7178-000 000	C	1	FOCUS LENS ASS'Y	
3	YG9-5096-000 000	B	1	ZOOM RING ASS'Y	
4	XB4-7260-507 000	F	1	SCREW M2.6x5	
5	YG9-5094-000 000	C	1	RELAY HOLDER ASS'Y	
6	XA4-9170-557 000	F	3	SCREW, CROSS-RECESS, PH	
7	YG9-5095-000 000	C	1	RELAY LENS ASS'Y	
8	XA4-9200-457 000	F	1	SCREW, CROSS-RECESS, PH	
9	YG9-5119-000 000	C	1	SWITCH, INFINITY	
10	DY1-7179-000 000	C	1	AF BLOCK ASS'Y	
11	XA4-9200-607 000	F	1	SCREW, CROSS-RECESS, PH	
12	YH7-0028-000 000	C	1	PZ MOTOR	
13	YN1-0235-000 000	C	1	LOW PASS FILTER	
14	YH8-0012-000 000	C	1	IG METER	
15	YH7-0027-000 000	C	1	AF MOTOR	
16	DG1-1602-000 000	C	1	CAMERA MAIN C.B.A.	
17	XA4-9201-209 000	F	2	SCREW, CROSS-RECESS, PH	
18	XA1-7200-307 000	F	2	SCREW, CROSS-RECESS, PH	
19	DG1-1621-000 000	C	1	REMOCON C.B.A.	
20	XA4-9200-509 000	F	8	SCREW, CROSS-RECESS, PH	
21	DY2-1383-000 000	B	1	CCD ASS'Y	
22	DH9-0540-000 000	C	1	CRYSTAL FILTER	
23	DA1-4506-000 000	C	1	HOLDER, (A) CAMERA	
24	DG1-1720-000 000	C	1	CAMERA KEY C.B.A.	
25	DA1-4507-000 000	C	1	HOLDER, (B) CAMERA	
26	DH3-0020-000 000	C	1	DC/DC CONVERTER	

Recorder Unit Section

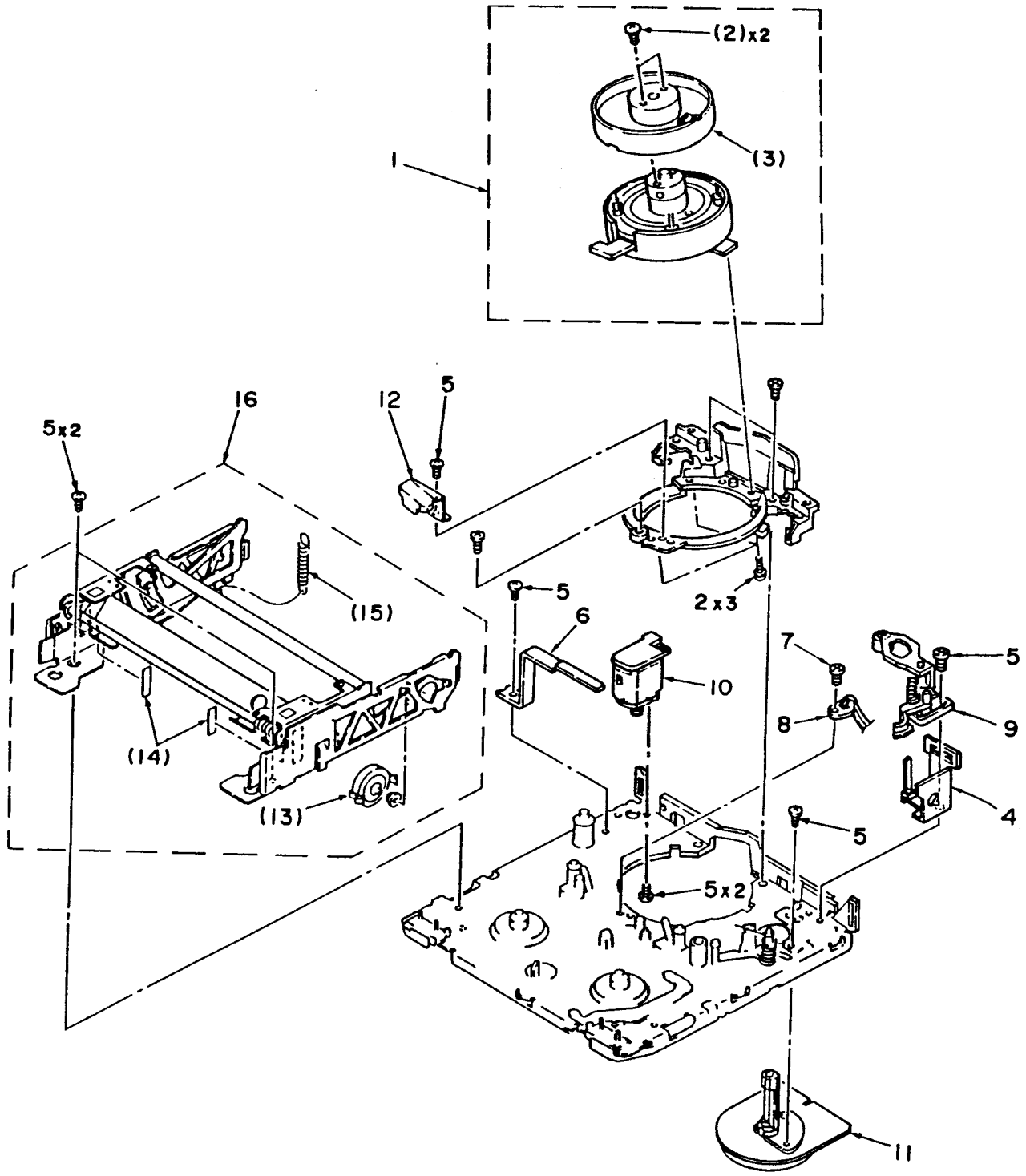


REF.No.D15-5830

MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	XA1-7200-257 000	F	2	SCREW, CROSS-RECESS, PH	
2	DA1-4600-000 000	C	1	COVER, DRUM	
3	DH2-1250-000 000	C	1	CONNECTOR 11P	
4	DH2-1301-000 000	C	1	PRINTED CARD	
5	DA1-1948-000 000	F	1	SCREW, CROSS-RECESS	
6	DA1-4525-000 000	C	1	HOLDER, RECORDER	
7	DG1-1614-000 000	C	1	RECORDER KEY C.B.A.	
8	XA1-7200-457 000	F	2	SCREW, CROSS-RECESS, PH	
9	DH9-0341-000 000	C	1	PIN JACK ASS'Y	
10	DF1-0756-000 000	C	1	PRINTED CORD ASS'Y	
11	DG1-1610-000 000	C	1	RECORDER MAIN C.B.A.	
12	DH2-1450-000 000	C	1	CONNECTOR 13P	
13	DH2-1427-000 000	C	1	PRINTED CORD	
14	DF1-0735-000 000	C	1	PRINTED CORD	
15	DH2-1429-000 000	C	1	PRINTED CORD	
16	DG1-1627-000 000	C	1	AUDIO C.B.A.	
17	DA1-5498-000 000	C	1	SHEET	

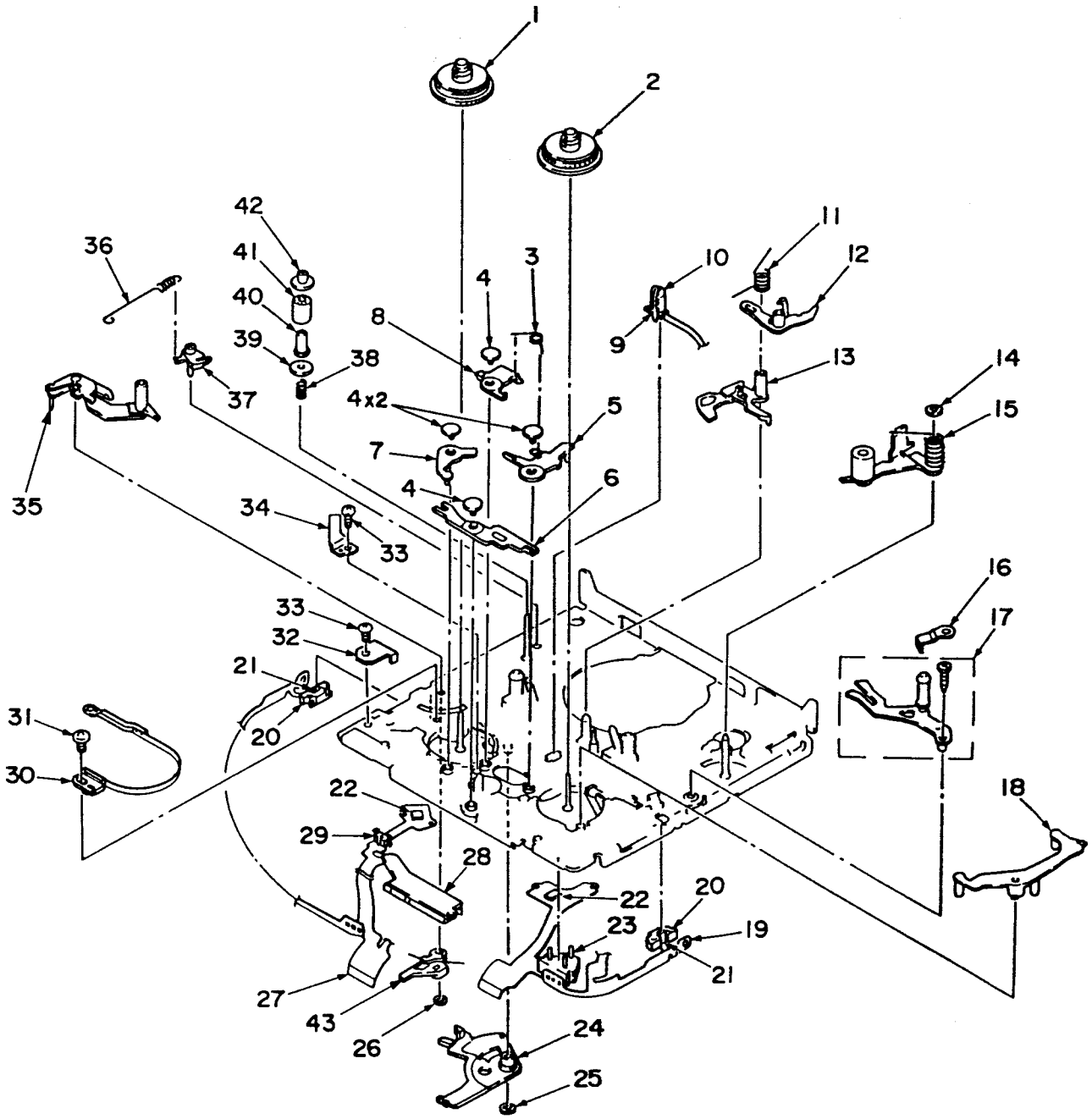
Mechanical Chassis Section I



MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2989-000 000	E	1	DRUM ASS'Y	
2	DY4-2730-000 000	F	5	SCREW, CROSS-RECESS	
3	DY4-2990-000 000	E	1	UPPER DRUM ASS'Y	
4	DY4-2925-000 000	C	1	HOLDER	
5	DY4-2727-000 000	F	8	SCREW, CROSS-RECESS	
6	DY4-2675-000 000	C	1	TERMINAL, EARTH	
7	DY4-2728-000 000	F	1	SCREW, CROSS-RECESS	
8	Y22-8120-000 000	B	1	SENSOR, DEW	
9	DY4-2910-000 000	C	1	ROLLER ASS'Y	
10	DY4-2911-000 000	C	1	MOTOR, LOADIND	
11	DY4-2726-000 000	C	1	CAPSTAN MOTOR	
12	DY4-2721-000 000	C	1	GUARD, GUIDE	
13	DY4-2720-000 000	C	1	DAMPER, OIL	
14	DY4-2729-000 000	C	2	TAPE	
15	DY4-2708-000 000	C	1	SPRING, COIL	
16	DY4-2673-000 000	C	1	CASSETTE, COMPARTMENT ASS'Y	

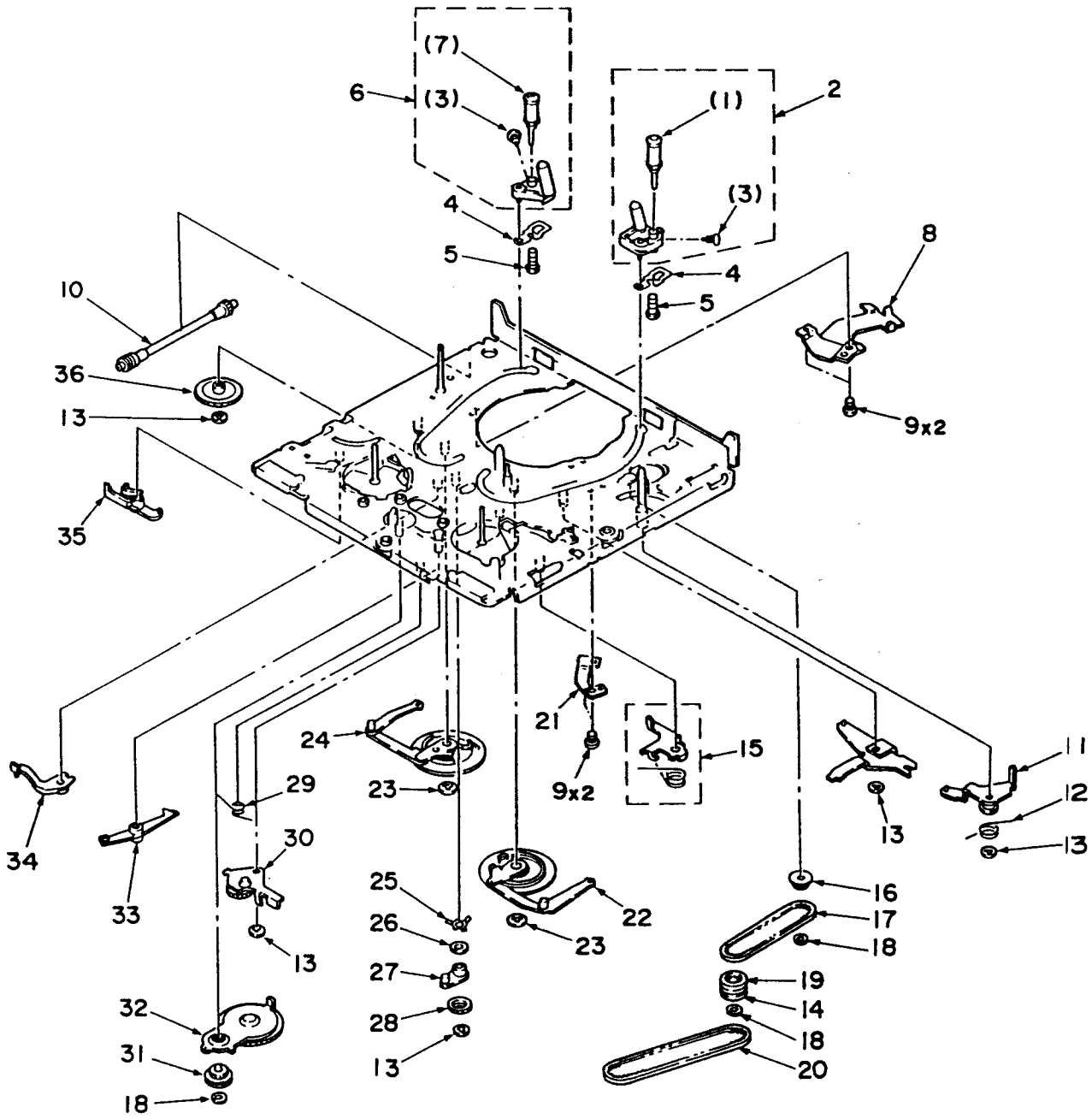
Mechanical Chassis Section 2



MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2663-000 000	C	1	REEL, SUPPLY	
2	DY4-2666-000 000	C	1	REEL, TAKE UP	
3	DY4-2699-000 000	C	1	SPRING, COIL	
4	DY4-2696-000 000	C	4	PIN, SHAFT	
5	DY4-2714-000 000	C	1	BRAKE, T	
6	DY4-2692-000 000	C	1	LEVER, LB	
7	DY4-2691-000 000	C	1	BRAKE, LB	
8	DY4-2713-000 000	C	1	BRAKE, S	
9	DY4-2710-000 000	C	1	HOLDER, LED	
10	Y22-8012-000 000	B	1	LED GL452S	
11	DY4-2697-000 000	C	1	SPRING, COIL	
12	DY4-2716-000 000	C	1	ARM, STOPPER	
13	DY4-2723-000 000	C	1	STOPPER, RK	
14	DY4-2440-000 000	F	1	WASHER	
15	DY4-2912-000 000	C	1	ARM, PINCH	
16	DY4-2707-000 000	C	1	SPRING, PLATE	
17	DY4-2664-000 000	C	1	ARM, TG7	
18	DY4-2712-000 000	C	1	ARM, RELEASE	
19	DY4-2680-000 000	C	1	FLEXIBLE P.C.B. (2)	
20	DY4-2722-000 000	C	2	HOLDER, SENSOR	
21	Y22-8123-000 000	B	2	PHOTO TRANSISTOR EE-P109	
22	Y22-8121-000 000	B	2	PHOTO IC SPI-315-25-CD	
23	DY4-2678-000 000	C	1	SWITCH, PUSH	
24	DY4-2917-000 000	C	1	LEVER, SWITCH	
25	DY4-2688-000 000	F	1	WASHER	
26	DY4-2681-000 000	F	1	WASHER	
27	DY4-2679-000 000	C	1	FLEXIBLE P.C.B. (1)	
28	DY4-2921-000 000	C	1	SWITCH, SLIDE	
29	DY4-2676-000 000	C	1	SWITCH	
30	DY4-2660-000 000	C	1	WIRE, TENSION	
31	DY4-2727-000 000	F	1	SCREW, CROSS-RECESS	
32	DY4-2725-000 000	C	1	PLATE, SWITCH	
33	DY4-2728-000 000	F	2	SCREW, CROSS-RECESS	
34	DY4-2690-000 000	C	1	PLATE, TL	
35	DY4-2669-000 000	C	1	ARM	
36	DY4-2724-000 000	C	1	SPRING, COIL	
37	DY4-2717-000 000	C	1	ARM, ADJUST	
38	DY4-2705-000 000	C	1	SPRING, COIL	
39	DY4-2701-000 000	C	1	FLANGE, TG2	
40	DY4-2704-000 000	C	1	SLEEVE, TG2	
41	DY4-2702-000 000	C	1	ROLLER, TG2	
42	DY4-2703-000 000	C	1	FLANGE, TG2	
43	DY4-2914-000 000	C	1	STOPPER	

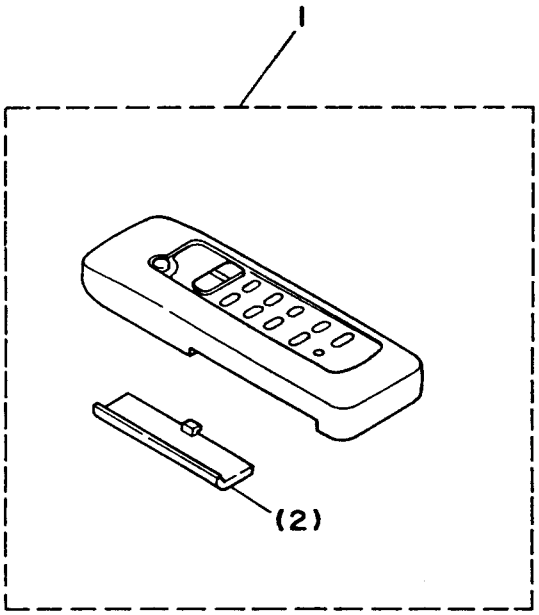
Mechanical Chassis Section 3



MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2674-000 000	C	1	ROLLER, GUIDE	
2	DY4-2991-000 000	C	1	COASTER, RIGHT	
3	DY4-2686-000 000	F	2	SCREW, CROSS-RECESS	
4	DY4-2685-000 000	C	2	SPRING, LEAF	
5	DY4-2689-000 000	F	2	SCREW, CROSS-RECESS	
6	DY4-2992-000 000	C	1	COASTER, LEFT	
7	DY4-2662-000 000	C	1	ROLLER, GUIDE	
8	DY4-2672-000 000	C	1	PLATE, SS	
9	DY4-2728-000 000	F	4	SCREW, CROSS-RECESS	
10	DY4-2919-000 000	C	1	WORM ASS'Y	
11	DY4-2665-000 000	C	1	ARM, PINCH SUB	
12	DY4-2706-000 000	C	1	SPRING, COIL	
13	DY4-2688-000 000	F	5	WASHER	
14	DY4-2922-000 000	C	1	PULLEY, RELAY B	
15	DY4-2659-000 000	C	1	BRAKE, TS	
16	DY4-2656-000 000	C	1	GEAR, JOINT	
17	DY4-2719-000 000	E	1	BELT(S), TIMING	
18	DY4-2681-000 000	F	3	WASHER	
19	DY4-2671-000 000	C	1	PULLEY, RELAY A	
20	DY4-2923-000 000	C	1	BELT(L), TIMING	
21	DY4-2684-000 000	C	1	PLATE, TT	
22	DY4-2743-000 000	C	1	GEAR	
23	DY4-2440-000 000	F	2	WASHER	
24	DY4-2742-000 000	C	1	GEAR	
25	DY4-2700-000 000	C	1	SPRING	
26	DY4-2527-000 000	F	1	WASHER	
27	DY4-2695-000 000	C	1	ARM, UL	
28	DY4-2694-000 000	C	1	GEAR, UL	
29	DY4-2698-000 000	C	1	SPRING, COIL	
30	DY4-2650-000 000	C	1	GEAR ASS'Y	
31	DY4-2915-000 000	C	1	GEAR, RC	
32	DY4-2918-000 000	C	1	GEAR, RK	
33	DY4-2693-000 000	C	1	ARM, RELEASE	
34	DY4-2715-000 000	C	1	BRAKE, UL	
35	DY4-2711-000 000	C	1	LEVER, EJECT	
36	DY4-2924-000 000	C	1	GEAR, WHEEL	

Accessory Parts Section



VWR-882

MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY1-5018-000 000	B	1	WIRELESS REMOTE CONTROLLER VWR-882	VCC830 ONLY
	DY2-1382-000 000	B	1	WIRELESS REMOTE CONTROLLER WL-50	E60F ONLY
2	DY4-2984-000 000	B	1	COVER, BATTERY	

ELECTRICAL PARTS

	SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
⚠	C2912	VC7-1430-272 000	D	1	CAPACITOR, CERA 2700pF/125V	
⚠	C2915	VC7-1360-102 000	D	1	CAPACITOR, CERA 1000pF/1KV	
⚠	C2917	VC7-1380-152 000	D	1	CAPACITOR, CERA 1500pF/500V	
	CN051	VS1-5340-003 000	C	1	CONNECTOR 3P	
	CN102	VS1-5105-014 000	C	1	CONNECTOR 14P	
	CN251	VS1-1169-013 000	C	1	CONNECTOR 13P	
	CN402	VS1-1169-013 000	C	1	CONNECTOR 13P	
	CN403	VS1-1169-011 000	C	1	CONNECTOR 11P	
	CN404	VS1-5256-024 000	C	1	CONNECTOR 24P	
	CN405	VS1-5256-008 000	C	1	CONNECTOR 8P	
	CN406	VS1-5105-010 000	C	1	CONNECTOR 10P	
	CN407	VS1-1169-015 000	C	1	CONNECTOR 15P	
	CN408	VS1-1169-010 000	C	1	CONNECTOR 10P	
	CN409	VS1-1169-005 000	C	1	CONNECTOR 5P	
	CN602	VS1-5106-014 000	C	1	CONNECTOR 14P	
	CN603	VS1-5106-010 000	C	1	CONNECTOR 10P	
	CN1001	VS1-5108-006 000	C	1	CONNECTOR 6P	
	CN2002	VS1-5256-024 000	C	1	CONNECTOR 24P	
	CN2005	VS1-5341-003 000	C	1	CONNECTOR 3P	
	CN2009	VS1-5269-012 000	C	1	CONNECTOR 12P	
	D101	WA1-1164-000 000	B	1	DIODE DAN202U	
	D102	WA1-0380-000 000	B	1	DIODE MA157	
	D103	WA1-1164-000 000	B	1	DIODE DAN202U	
	D104	WA1-1146-000 000	B	1	DIODE MA707	
	D108	WA1-1084-000 000	B	1	DIODE MA110	
	D301	WA1-1084-000 000	B	1	DIODE MA110	
	D401	WA1-0604-000 000	B	1	DIODE MA159	
	D402	WA1-0604-000 000	B	1	DIODE MA159	
	D403	WA1-0604-000 000	B	1	DIODE MA159	
	D404	WA1-1084-000 000	B	1	DIODE MA110	
	D405	WA1-5080-000 000	B	1	DIODE EC10QS03	
	D406	WA1-5080-000 000	B	1	DIODE EC10QS03	
	D407	WA1-1084-000 000	B	1	DIODE MA110	
	D408	WA1-1084-000 000	B	1	DIODE MA110	
	D409	WA1-1146-000 000	B	1	DIODE MA707	
	D410	WA1-1146-000 000	B	1	DIODE MA707	
	D1001	WA1-1084-000 000	B	1	DIODE MA110	
	D1002	WA1-5091-000 000	B	1	VARIABLE CAPACITANCE DIODE 1SV205	
	D1003	WA1-1084-000 000	B	1	DIODE MA110	
	D1004	WA1-1084-000 000	B	1	DIODE MA110	
	D1005	WA1-1153-000 000	B	1	DIODE DA204U	
	D1101	WA1-1084-000 000	B	1	DIODE MA110	
	D1401	WA1-5061-000 000	B	1	DIODE DAP202U	
	D1402	WA1-1084-000 000	B	1	DIODE MA110	
	D2001	WA1-0604-000 000	B	1	DIODE MA159	
	D2002	WA1-0604-000 000	B	1	DIODE MA159	
	D2901	WA1-0989-000 000	B	1	ZENER DIODE MA3100	
	D2902	WA1-1084-000 000	B	1	DIODE MA110	
	D2903	WA1-1084-000 000	B	1	DIODE MA110	
	D2904	WA1-1123-000 000	B	1	DIODE AG01Z	
	D2941	WA1-0989-000 000	B	1	ZENER DIODE MA3100	
	D2942	WA1-1084-000 000	B	1	DIODE MA110	
	IC101	DH4-0225-000 000	B	1	IC MM33-1002F	
	IC102	DH4-0205-000 000	B	1	IC LVC556F-2	
	IC103	DH4-0139-000 000	B	1	IC CXL1502M	
	IC104	DH4-0180-001 000	B	1	IC CXA1200BQ	
	IC105	WA4-5328-000 000	B	1	IC MM1031M	
	IC106	WA3-5173-000 000	B	1	IC SC7S00F	
	IC251	DH4-0192-000 000	B	1	IC CXA1202R	
	IC252	WA3-5173-000 000	B	1	IC SC7S00F	

ELECTRICAL PARTS

	SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	IC301	DH4-0196-000 000	B	1	IC CXA1203N	
	IC401	DH4-0378-000 000	B	1	IC CXP80116-577Q	
	IC402	DH4-0318-000 000	B	1	IC CXA1127AM	
	IC403	WA4-5161-000 000	B	1	IC CXA1512M	
	IC404	WA4-5127-000 000	B	1	IC CXA8006M	
	IC405	DH4-0205-000 000	B	1	IC LVC556F-2	
	IC406	WA4-1167-000 000	B	1	IC RH5RA50AA	
	IC407	WA4-1145-000 000	B	1	IC RH5VA45AA	
	IC501	DH4-0190-000 000	B	1	IC CXA1237AR	
	IC560	WA4-0509-000 000	B	1	IC NJM2043M	
	IC701	DH4-0135-000 000	B	1	IC CXA1204Q	
	IC801	WA4-5316-000 000	B	1	IC TK11447	
	IC1001	DH4-0413-000 000	B	1	IC MN5179	
	IC1002	DH4-0125-000 000	B	1	IC MN53015CXY	
	IC1003	WA3-5781-000 000	B	1	IC MN3110SA	
	IC1005	DH4-0399-000 000	B	1	IC UN431-TX	
	IC1006	WA3-3679-000 000	B	1	IC MN3820S	
	IC1007	WA4-5344-000 000	B	1	IC AN2011SB	
	IC1101	WA4-0458-000 000	B	1	IC NJM3414M	
	IC1102	WA4-5305-000 000	B	1	IC AN2163FHP	
	IC1301	WA4-5306-000 000	B	1	IC AN2457SB	
	IC1401	WA4-1248-000 000	B	1	IC μPC324G2	
	IC1402	WA4-1249-000 000	B	1	IC μPC358G2	
	IC1403	WA3-3175-000 000	B	1	IC BU4066BF	
	IC1404	WA3-5800-000 000	B	1	IC M62352GP	
	IC1405	WA3-5800-000 000	B	1	IC M62352GP	
	IC1406	Y22-2619-000 000	B	1	IC SC407624FU	
	IC1407	WA4-1145-000 000	B	1	IC RH5VA45AA	
	IC2001	DH4-0371-010 000	B	1	IC CXP81312-313Q	
	IC2002	DH4-0284-000 000	B	1	IC μPD6145G-619	
	IC2003	WA3-5837-000 000	B	1	IC RTC-4533A	
	IC2004	WA3-4008-000 000	B	1	IC RH5VA21AA	
	IC2005	WA4-5167-000 000	B	1	IC LB1830M	
	IC2901	DH4-0504-000 000	B	1	IC BA7147F	
	IC2931	DH4-0205-000 000	B	1	IC LVC556F-2	
	IC2941	WA4-0349-000 201	B	1	IC NJM2904M	
⚠	L2902	DH9-0561-000 000	D	1	COIL, LINEARITY	
	LED501	WG1-0427-000 000	B	1	LED LT1D51A	
	LED2001	WG1-5031-000 000	B	1	LED GL4HD-002	
	Q101	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
	Q104	WA2-5051-000 000	B	1	TRANSISTOR DTA144EU	
	Q105	WA2-1305-000 000	B	1	TRANSISTOR IMH2	
	Q106	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
	Q107	WA2-1297-000 000	B	1	TRANSISTOR IMB7	
	Q108	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
	Q109	WA2-1400-000 000	B	1	TRANSISTOR 2SA1576	
	Q110	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
	Q112	WA2-1305-000 000	B	1	TRANSISTOR IMH2	
	Q113	WA2-1305-000 000	B	1	TRANSISTOR IMH2	
	Q114	WA2-1400-000 000	B	1	TRANSISTOR 2SA1576	
	Q116	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
	Q117	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
	Q118	WA2-1233-000 000	B	1	TRANSISTOR IMX1	
	Q119	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
	Q121	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
	Q122	WA2-1407-000 000	B	1	TRANSISTOR DTC114TU	
	Q124	WA2-5149-000 000	B	1	TRANSISTOR 2SB1412F5	
	Q126	WA2-1233-000 000	B	1	TRANSISTOR IMX1	
	Q130	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
	Q131	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
Q132	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
Q133	WA2-1305-000 000	B	1	TRANSISTOR TMH2	
Q134	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
Q135	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q136	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q137	WA2-1233-000 000	B	1	TRANSISTOR IMX1	
Q138	WA2-5051-000 000	B	1	TRANSISTOR DTA144EU	
Q139	WA2-1407-000 000	B	1	TRANSISTOR DTC114TU	
Q140	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
Q252	WA2-5051-000 000	B	1	TRANSISTOR DTA144EU	
Q253	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
Q254	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q255	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q258	WA2-1400-000 000	B	1	TRANSISTOR 2SA1576	
Q259	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q302	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q303	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
Q401	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q402	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q403	WA2-1377-000 000	B	1	TRANSISTOR DTC143EU	
Q404	WA2-1405-000 000	B	1	TRANSISTOR DTA124EU	
Q405	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
Q406	WA2-1407-000 000	B	1	TRANSISTOR DTC114TU	
Q407	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
Q408	WA2-1377-000 000	B	1	TRANSISTOR DTC143EU	
Q409	WA2-1377-000 000	B	1	TRANSISTOR DTC143EU	
Q410	WA2-5220-000 000	B	1	TRANSISTOR DTA143EU	
Q411	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
Q412	WA2-5088-000 000	B	1	TRANSISTOR DTC114EU	
Q413	WA2-5152-000 000	B	1	TRANSISTOR 2SB1424	
Q414	WA2-1230-000 000	B	1	TRANSISTOR IMH6	
Q415	WA2-5152-000 000	B	1	TRANSISTOR 2SB1424	
Q416	WA2-1240-000 000	B	1	TRANSISTOR IMT1	
Q417	WA2-1230-000 000	B	1	TRANSISTOR IMH6	
Q418	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q419	WA2-1400-000 000	B	1	TRANSISTOR 2SA1576	
Q420	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213	
Q501	WA2-1400-000 000	B	1	TRANSISTOR 2SA1576	
Q502	WA2-0646-000 000	B	1	TRANSISTOR 2SD1328	
Q560	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q561	WA2-0646-000 000	B	1	TRANSISTOR 2SD1328	
Q702	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q803	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q804	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q805	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q806	WA2-1400-000 000	B	1	TRANSISTOR 2SA1576	
Q807	WA2-1233-000 000	B	1	TRANSISTOR IMX1	
Q1001	WA2-1501-000 000	B	1	FET 2SK198	
Q1002	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q1003	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q1005	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q1006	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q1007	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q1008	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q1102	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1103	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q1104	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
Q1105	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q1106	WA2-1351-000 000	B	1	TRANSISTOR IMD6	
Q1107	WA2-1400-000 000	B	1	TRANSISTOR 2SA1576	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
Q1108	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
Q1109	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1110	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q1111	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1112	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q1113	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1114	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
Q1115	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q1116	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q1117	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1119	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1120	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1121	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1122	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q1123	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1124	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1125	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q1226	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q1302	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q1401	WA2-1337-000 000	B	1	TRANSISTOR 2SC4081	
Q1402	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q1403	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q2001	WA2-1230-000 000	B	1	TRANSISTOR IMH6	
Q2002	WA2-5051-000 000	B	1	TRANSISTOR DTA144EU	
Q2003	WA2-5051-000 000	B	1	TRANSISTOR DTA144EU	
Q2004	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
Q2005	WA2-5051-000 000	B	1	TRANSISTOR DTA144EU	
Q2006	WA2-5062-000 000	B	1	TRANSISTOR DTC144TU	
Q2007	WA2-5272-000 000	B	1	TRANSISTOR IMH14	
Q2008	WA2-1400-000 000	B	1	TRANSISTOR 2SA1576	
Q2009	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
Q2901	WA2-0839-000 000	B	1	TRANSISTOR 2SA1226	
Q2902	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q2904	WA2-5151-000 000	B	1	TRANSISTOR 2SD968A-S	
Q2931	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213	
Q2941	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2942	WA2-5222-000 000	B	1	FET 2SK1468	
Q2943	WA2-1378-000 000	B	1	TRANSISTOR DTC144EU	
Q2944	WA2-5221-000 000	B	1	TRANSISTOR 2SD1757K	
Q2971	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
⚠ RR101	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠ RR401	DH4-0144-000 000	D	1	LINK, IC ICP-F25	
⚠ RR2001	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠ RR2931	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠ RR2932	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠ RR2933	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠ RR2934	DH4-0166-000 000	D	1	LINK, IC D2000	
⚠ RR2935	WD8-5005-000 000	D	1	LINK, IC D1600	
SW2941	DH9-0546-000 000	C	1	SWITCH, BATTERY	
SW2942	DH9-0546-000 000	C	1	SWITCH, BATTERY	
⚠ T2901	DH9-0545-000 000	D	1	FLYBACK TRANSFORMER	
VC1001	VC6-0340-200 000	C	1	CAPACITOR, TRIMMER 20pF	
VC1002	VC6-0340-200 000	C	1	CAPACITOR, TRIMMER 20pF	
VC1301	VC6-0340-300 000	C	1	CAPACITOR, TRIMMER 30pF	
VC2001	VC6-0340-300 000	C	1	CAPACITOR, TRIMMER 30pF	
VR103	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR104	VR5-7780-223 000	C	1	RESISTOR, JARIABLE 22KΩ	
VR105	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR106	VR5-7780-332 000	C	1	RESISTOR, VARIABLE 3.3KΩ	
VR107	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	

ELECTRICAL PARTS

	SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	VR108	VR5-7780-102 000	C	1	RESISTOR, VARIABLE 1KΩ	
	VR109	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
	VR111	VR5-7780-221 000	C	1	RESISTOR, VARIABLE 220Ω	
	VR251	VR5-7780-473 000	C	1	RESISTOR, VARIABLE 47KΩ	
	VR401	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
	VR402	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
	VR501	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
	VR502	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
	VR702	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
	VR801	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
	VR1001	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
	VR1101	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
	VR2901	VR5-7780-101 000	C	1	RESISTOR, VARIABLE 100Ω	
⚠	VR2903	VR7-0380-205 000	D	1	RESISTOR, VARIABLE 2MΩ/200V	
	VR2904	VR7-0710-504 000	D	1	RESISTOR, VARIABLE 500KΩ/100V	

PARTS LIST

	PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	2	DA1-1857-000 000	B	1	KNOB, BATTERY EJECT	
	6	DA1-1948-000 000	F	1	SCREW, CROSS-RECESS	
	2	DA1-3979-000 000	C	1	TERMINAL,(1)	
	2	DA1-3980-000 000	C	1	TERMINAL,(2)	
	2	DA1-3985-000 000	C	1	PLATE(1), GRIP	
	2	DA1-3986-000 000	C	1	PLATE(2), GRIP	
	2	DA1-4240-000 000	B	1	RING, CRT RUBBER	
	2	DA1-4403-000 000	B	1	SHOE, ACCESSORY	
	4	DA1-4506-000 000	C	1	HOLDER, (A) CAMERA	
	4	DA1-4507-000 000	C	1	HOLDER, (B) CAMERA	
	2	DA1-4520-000 000	C	2	TERMINAL, BATTERY	
	2	DA1-4523-000 000	B	1	COVER, BATTERY	
	2	DA1-4524-000 000	B	1	KNOB, TELE/WIDE	
	6	DA1-4525-000 000	C	1	HOLDER, RECORDER	
	2	DA1-4534-000 000	F	1	SCREW, CROSS-RECESS	
	2	DA1-4571-000 000	F	2	SCREW, CROSS-RECESS	
	2	DA1-4586-000 000	C	1	SEAL	
	6	DA1-4600-000 000	C	1	COVER, DRUM	
	2	DA1-4751-000 000	C	1	MASK, CRT	
	2	DA1-5242-000 000	B	1	STRAP, HAND	
	2	DA1-5437-000 000	B	1	HOOD	
	2	DA1-5438-000 000	C	1	SHEET, AF BLOCK	
	6	DA1-5498-000 000	C	1	SHEET	
	6	DF1-0735-000 000	C	1	PRINTED CORD	
	6	DF1-0756-000 000	C	1	PRINTED CORD ASS'Y	
	2	DF1-1155-000 000	B	1	COVER, CASSETTE	
	4	DG1-1602-000 000	C	1	CAMERA MAIN C.B.A.	
	6	DG1-1610-000 000	C	1	RECORDER MAIN C.B.A.	
	6	DG1-1614-000 000	C	1	RECORDER KEY C.B.A.	
⚠	2	DG1-1617-000 000	C	1	GRIP C.B.A.	
	4	DG1-1621-000 000	C	1	REMOCON C.B.A.	
	6	DG1-1627-000 000	C	1	AUDIO C.B.A.	
	2	DG1-1712-000 000	B	1	RIGHT COVER ASS'Y	E60F ONLY
	4	DG1-1720-000 000	C	1	CAMERA KEY C.B.A.	
	2	DG1-1725-000 000	B	1	TOP COVER ASS'Y	E60F ONLY
	2	DG1-1926-000 000	B	1	LEFT COVER, GRIP	
	2	DG1-1930-000 000	B	1	LENS COVER ASS'Y	
	2	DG1-1932-000 000	B	1	RIGHT COVER ASS'Y	VCC830 ONLY
	2	DG1-1933-000 000	B	1	TOP COVER ASS'Y	VCC830 ONLY
	6	DH2-1250-000 000	C	1	CONNECTOR 11P	
	6	DH2-1301-000 000	C	1	PRINTED CORD	
	6	DH2-1427-000 000	C	1	PRINTED CORD	
	6	DH2-1429-000 000	C	1	PRINTED CORD	
	6	DH2-1450-000 000	C	1	CONNECTOR 13P	
	4	DH3-0020-000 000	C	1	DC/DC CONVERTER	
		DH4-0125-000 000	B	1	IC MN53015CXY	
		DH4-0135-000 000	B	1	IC CXA1204Q	
		DH4-0139-000 000	B	1	IC CXL1502M	
⚠		DH4-0142-000 000	B	5	LINK, IC ICP-F15	
⚠		DH4-0144-000 000	D	1	LINK, IC ICP-F25	
⚠		DH4-0166-000 000	D	1	LINK, IC D2000	
		DH4-0180-001 000	D	1	IC CXA1200BQ	
		DH4-0190-000 000	B	1	IC CXA1237AR	
		DH4-0192-000 000	B	1	IC CXA1202R	
		DH4-0196-000 000	B	1	IC CXA1203N	
		DH4-0205-000 000	B	3	IC LVC556F-2	
		DH4-0225-000 000	B	1	IC MM33-1002F	
		DH4-0284-000 000	B	1	IC μPD6145G-619	
		DH4-0318-000 000	B	1	IC CXA1127AM	
		DH4-0371-010 000	B	1	IC CXP81312-313Q	

PARTS LIST

	PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
		DH4-0378-000 000	B	1	IC CXP80116-577Q	
		DH4-0399-000 000	D	1	IC UN431-TX	
		DH4-0413-000 000	B	1	IC MN5179	
		DH4-0504-000 000	B	1	IC BA7147F	
	6	DH9-0341-000 000	C	1	PIN JACK ASS'Y	
	2	DH9-0520-000 000	C	1	MICROPHONE ASS'Y	
	4	DH9-0540-000 000	C	1	CRYSTAL FILTER	
⚠		DH9-0545-000 000	D	1	FLYBACK TRANSFORMER	
		DH9-0546-000 000	C	2	SWITCH, BATTERY	
⚠		DH9-0561-000 000	D	1	COIL, LINEARITY	
	14	DY1-5018-000 000	B	1	WIRELESS REMOTE CONTROLLER VWR-882	VCC830 ONLY
	2	DY1-5025-000 000	B	1	CAP, LENS	
	4	DY1-7177-000 000	C	1	ZOOM LENS ASS'Y	
	4	DY1-7178-000 000	C	1	FOCUS LENS ASS'Y	
	4	DY1-7179-000 000	C	1	AF BLOCK ASS'Y	
	2	DY2-1223-000 000	B	1	SPORTS FINDER SF-200	
	2	DY2-1374-000 000	B	1	RIGHT COVER, GRIP	
⚠	2	DY2-1375-000 000	D	1	CRT ASS'Y	
	2	DY2-1376-000 000	B	1	LEFT COVER, ASS'Y	
	14	DY2-1382-000 000	B	1	WIRELESS REMOTE CONTROLLER WL-50	E60F ONLY
	4	DY2-1383-000 000	B	1	CCD ASS'Y	
	10,12	DY4-2440-000 000	F	3	WASHER	
	12	DY4-2527-000 000	F	1	WASHER	
	12	DY4-2650-000 000	C	1	GEAR, ASS'Y	
	12	DY4-2656-000 000	C	1	GEAR, JOINT	
	12	DY4-2659-000 000	C	1	BRAKE, TS	
	10	DY4-2660-000 000	C	1	WIRE, TENSION	
	12	DY4-2662-000 000	C	1	ROLLER, GUIDE	
	10	DY4-2663-000 000	C	1	REEL, SUPPLY	
	10	DY4-2664-000 000	C	1	ARM, TG7	
	12	DY4-2665-000 000	C	1	ARM, PINCH SUB	
	10	DY4-2666-000 000	C	1	REEL, TAKE UP	
	10	DY4-2669-000 000	C	1	ARM	
	12	DY4-2671-000 000	C	1	PULLEY, RELAY A	
	12	DY4-2672-000 000	C	1	PLATE, SS	
	8	DY4-2673-000 000	C	1	CASSETTE, COMPARTMENT ASS'Y	
	12	DY4-2674-000 000	C	1	ROLLER, GUIDE	
	8	DY4-2675-000 000	C	1	TERMINAL, EARTH	
	10	DY4-2676-000 000	C	1	SWITCH	
	10	DY4-2678-000 000	C	1	SWITCH, PUSH	
	10	DY4-2679-000 000	C	1	FLEXIBLE P.C.B.(1)	
	10	DY4-2680-000 000	C	1	FLEXIBLE P.C.B.(2)	
	10,12	DY4-2681-000 000	F	4	WASHER	
	12	DY4-2684-000 000	C	1	PLATE, TT	
	12	DY4-2685-000 000	C	2	SPRING, LEAF	
	12	DY4-2686-000 000	F	2	SCREW, CROSS-RECESS	
	10,12	DY4-2688-000 000	F	6	WASHER	
	12	DY4-2689-000 000	F	2	SCREW, CROSS-RECESS	
	10	DY4-2690-000 000	C	1	PLATE, TL	
	10	DY4-2691-000 000	C	1	BRAKE, LB	
	10	DY4-2692-000 000	C	1	LEVER, LB	
	12	DY4-2693-000 000	C	1	ARM, RELEASE	
	12	DY4-2694-000 000	C	1	GEAR, UL	
	12	DY4-2695-000 000	C	1	ARM, UL	
	10	DY4-2696-000 000	C	4	PIN, SHAFT	
	10	DY4-2697-000 000	C	1	SPRING, COIL	
	12	DY4-2698-000 000	C	1	SPRING, COIL	
	10	DY4-2699-000 000	C	1	SPRING, COIL	
	12	DY4-2700-000 000	C	1	SPRING	
	10	DY4-2701-000 000	C	1	FLANGE, TG2	

PARTS LIST

	PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	10	DY4-2702-000 000	C	1	ROLLER, TG2	
	10	DY4-2703-000 000	C	1	FLANGE, TG2	
	10	DY4-2704-000 000	C	1	SLEEVE, TG2	
	10	DY4-2705-000 000	C	1	SPRING, COIL	
	12	DY4-2706-000 000	C	1	SPRING, COIL	
	10	DY4-2707-000 000	C	1	SPRING, PLATE	
	8	DY4-2708-000 000	C	1	SPRING, COIL	
	10	DY4-2710-000 000	C	1	HOLDER, LED	
	12	DY4-2711-000 000	C	1	LEVER, EJECT	
	10	DY4-2712-000 000	C	1	ARM, RELEASE	
	10	DY4-2713-000 000	C	1	BRAKE, S	
	10	DY4-2714-000 000	C	1	BRAKE, T	
	12	DY4-2715-000 000	C	1	BRAKE, UL	
	10	DY4-2716-000 000	C	1	ARM, STOPPER	
	10	DY4-2717-000 000	C	1	ARM, ADJUST	
	12	DY4-2719-000 000	E	1	BELT(S), TIMING	
	8	DY4-2720-000 000	C	1	DAMPER, OIL	
	8	DY4-2721-000 000	C	1	GUARD, GUIDE	
	10	DY4-2722-000 000	C	2	HOLDER SENSOR	
	10	DY4-2723-000 000	C	1	STOPPER, RK	
	10	DY4-2724-000 000	C	1	SPRING, COIL	
	10	DY4-2725-000 000	C	1	PLATE, SWITCH	
	8	DY4-2726-000 000	C	1	CAPSTAN MOTOR	
	8,10	DY4-2727-000 000	F	9	SCREW, CROSS-RECESS	
	8,10,12	DY4-2728-000 000	F	7	SCREW, CROSS-RECESS	
	8	DY4-2729-000 000	C	2	TAPE	
	8	DY4-2730-000 000	F	5	SCREW, CROSS-RECESS	
	12	DY4-2742-000 000	C	1	GEAR	
	12	DY4-2743-000 000	C	1	GEAR	
	8	DY4-2910-000 000	C	1	ROLLER ASS'Y	
	8	DY4-2911-000 000	C	1	MOTOR, LOADING	
	10	DY4-2912-000 000	C	1	ARM, PINCH	
	10	DY4-2914-000 000	C	1	STOPPER	
	12	DY4-2915-000 000	C	1	GEAR, RC	
	10	DY4-2917-000 000	C	1	LEVER, SWITCH	
	12	DY4-2918-000 000	C	1	GEAR, RK	
	12	DY4-2919-000 000	C	1	WORM ASS'Y	
	10	DY4-2921-000 000	C	1	SWITCH, SLIDE	
	12	DY4-2922-000 000	C	1	PULLY, RELAY B	
	12	DY4-2923-000 000	C	1	BELT(L), TIMING	
	12	DY4-2924-000 000	C	1	GEAR, WHEEL	
	8	DY4-2925-000 000	C	1	HOLDER	
	14	DY4-2984-000 000	B	1	COVER, BATTERY	
	8	DY4-2989-000 000	E	1	DRUM ASS'Y	
	8	DY4-2990-000 000	E	1	UPPER DRUM ASS'Y	
	12	DY4-2991-000 000	C	1	COASTER, RIGHT	
	12	DY4-2992-000 000	C	1	COASTER, LEFT	
		VC6-0340-200 000	C	2	CAPACITOR, TRIMMER 20pF	
		VC6-0340-300 000	C	2	CAPACITOR, TRIMMER 30pF	
⚠		VC7-1360-102 000	D	1	CAPACITOR, CERA 1000pF/1KV	
⚠		VC7-1380-152 000	D	1	CAPACITOR, CERA 1500pF/500V	
⚠		VC7-1430-272 000	D	1	CAPACITOR, CERA 2700pF/125V	
		VR5-7780-101 000	C	1	RESISTOR, VARIABLE 100Ω	
		VR5-7780-102 000	C	1	RESISTOR, VARIABLE 1KΩ	
		VR5-7780-103 000	C	5	RESISTOR, VARIABLE 10KΩ	
		VR5-7780-221 000	C	1	RESISTOR, VARIABLE 220Ω	
		VR5-7780-222 000	C	2	RESISTOR, VARIABLE 2.2KΩ	
		VR5-7780-223 000	C	4	RESISTOR, VARIABLE 22KΩ	
		VR5-7780-332 000	C	1	RESISTOR, VARIABLE 3.3KΩ	
		VR5-7780-472 000	C	2	RESISTOR, VARIABLE 4.7KΩ	

PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	VR5-7780-473 000	C	1	RESISTOR, VARIABLE 47KΩ	
⚠	VR7-0380-205 000	D	1	RESISTOR, VARIABLE 2MΩ/200V	
	VR7-0710-504 000	D	1	RESISTOR, VARIABLE 500KΩ/100V	
	VS1-1169-005 000	C	1	CONNECTOR 5P	
	VS1-1169-010 000	C	1	CONNECTOR 10P	
	VS1-1169-011 000	C	1	CONNECTOR 11P	
	VS1-1169-013 000	C	2	CONNECTOR 13P	
	VS1-1169-015 000	C	1	CONNECTOR 15P	
	VS1-5105-010 000	C	1	CONNECTOR 10P	
	VS1-5105-014 000	C	1	CONNECTOR 14P	
	VS1-5106-010 000	C	1	CONNECTOR 10P	
	VS1-5106-014 000	C	1	CONNECTOR 14P	
	VS1-5108-006 000	C	1	CONNECTOR 6P	
	VS1-5256-008 000	C	1	CONNECTOR 8P	
	VS1-5256-024 000	C	2	CONNECTOR 24P	
	VS1-5269-012 000	C	1	CONNECTOR 12P	
	VS1-5340-003 000	C	1	CONNECTOR 3P	
	VS1-5341-003 000	C	1	CONNECTOR 3P	
	WA1-0380-000 000	B	1	DIODE MA157	
	WA1-0604-000 000	B	5	DIODE MA159	
	WA1-0989-000 000	B	2	ZENER DIODE MA3100	
	WA1-1084-000 000	B	13	DIODE MA110	
	WA1-1123-000 000	B	1	DIODE AG01Z	
	WA1-1146-000 000	B	3	DIODE MA707	
	WA1-1153-000 000	B	1	DIODE DA204U	
	WA1-1164-000 000	B	2	DIODE DAN202U	
	WA1-5061-000 000	B	1	DIODE DAP202U	
	WA1-5080-000 000	B	2	DIODE EC10QS03	
	WA1-5091-000 000	B	1	VARIABLE CAPACITANCE DIODE 1SV205	
	WA2-0646-000 000	B	2	TRANSISTOR 2SD1328	
	WA2-0797-000 201	B	2	TRANSISTOR 2SA1213	
	WA2-0839-000 000	B	1	TRANSISTOR 2SA1226	
	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
	WA2-1228-000 000	B	2	TRANSISTOR IMT2	
	WA2-1230-000 000	B	3	TRANSISTOR IMH6	
	WA2-1231-000 000	B	3	TRANSISTOR IMH8	
	WA2-1232-000 000	B	14	TRANSISTOR IMZ1	
	WA2-1233-000 000	B	4	TRANSISTOR IMX1	
	WA2-1234-000 000	B	10	TRANSISTOR IMX2	
	WA2-1240-000 000	B	1	TRANSISTOR IMT1	
	WA2-1256-000 000	B	5	TRANSISTOR IMH5	
	WA2-1297-000 000	B	1	TRANSISTOR IMB7	
	WA2-1305-000 000	B	4	TRANSISTOR IMH2	
	WA2-1337-000 000	B	20	TRANSISTOR 2SC4081	
	WA2-1351-000 000	B	1	TRANSISTOR IMD6	
	WA2-1377-000 000	B	3	TRANSISTOR DTC143EU	
	WA2-1378-000 000	B	13	TRANSISTOR DTC144EU	
	WA2-1400-000 000	B	8	TRANSISTOR 2SA1576	
	WA2-1405-000 000	B	1	TRANSISTOR DTA124EU	
	WA2-1407-000 000	B	3	TRANSISTOR DTC114TU	
	WA2-1498-000 000	B	2	TRANSISTOR 2SA1162	
	WA2-1501-000 000	B	1	FET 2SK198	
	WA2-5051-000 000	B	6	TRANSISTOR DTA144EU	
	WA2-5062-000 000	B	1	TRANSISTOR DTC144TU	
	WA2-5088-000 000	B	1	TRANSISTOR DTC114EU	
	WA2-5149-000 000	B	1	TRANSISTOR 2SB1412F5	
	WA2-5151-000 000	D	1	TRANSISTOR 2SD968A-S	
	WA2-5152-000 000	B	2	TRANSISTOR 2SB1424	
	WA2-5220-000 000	B	1	TRANSISTOR DTA143EU	
	WA2-5221-000 000	B	1	TRANSISTOR 2SD1757K	

PARTS LIST

	PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
		WA2-5222-000 000	B	1	FET 2SK1468	
		WA2-5272-000 000	B	1	TRANSISTOR IMH14	
		WA3-3175-000 000	B	1	IC BU4066BF	
		WA3-3679-000 000	B	1	IC MN3820S	
		WA3-4008-000 000	B	1	IC RH5VA21AA	
		WA3-5173-000 000	B	2	IC SC7S00F	
		WA3-5781-000 000	B	1	IC MN3110SA	
		WA3-5800-000 000	B	2	IC M62352GP	
		WA3-5837-000 000	B	1	IC RTC-4533A	
		WA4-0349-000 201	B	1	IC NJM2904M	
		WA4-0458-000 000	B	1	IC NJM3414M	
		WA4-0509-000 000	B	1	IC NJM2043M	
		WA4-1145-000 000	B	2	IC RH5VA45AA	
		WA4-1167-000 000	B	1	IC RH5RA50AA	
		WA4-1248-000 000	B	1	IC μPC324G2	
		WA4-1249-000 000	B	1	IC μPC358G2	
		WA4-5127-000 000	B	1	IC CXA8006M	
		WA4-5161-000 000	B	1	IC CXA1512M	
		WA4-5167-000 000	B	1	IC LB1830M	
		WA4-5305-000 000	B	1	IC AN2163FHP	
		WA4-5306-000 000	B	1	IC AN2457SB	
		WA4-5316-000 000	B	1	IC TK11447	
		WA4-5328-000 000	B	1	IC MM1031M	
		WA4-5344-000 000	B	1	IC AN2011SB	
⚠		WD8-5005-000 000	D	1	LINK, IC D1600	
		WG1-0427-000 000	B	1	LED LT1D51A	
		WG1-5031-000 000	B	1	LED GL4HD-002	
	6	XA1-7200-257 000	F	2	SCREW, CROSS-RECESS, PH	
	4	XA1-7200-307 000	F	2	SCREW, CROSS-RECESS, PH	
	2	XA1-7200-409 000	F	4	SCREW, CROSS-RECESS, PH	
	6	XA1-7200-457 000	F	2	SCREW, CROSS-RECESS, PH	
	4	XA4-9170-557 000	F	3	SCREW, CROSS-RECESS, PH	
	2	XA4-9200-409 000	F	15	SCREW, CROSS-RECESS, PH	
	4	XA4-9200-457 000	F	1	SCREW, CROSS-RECESS, PH	
	2,4	XA4-9200-509 000	F	10	SCREW, CROSS-RECESS, PH	
	4	XA4-9200-607 000	F	1	SCREW, CROSS-RECESS, PH	
	4	XA4-9201-209 000	F	2	SCREW, CROSS-RECESS, PH	
	2	XA4-9260-709 000	F	4	SCREW, CROSS-RECESS, PH	
	2	XA9-0435-000 000	F	1	SCREW, CROSS-RECESS, PH	
	2	XA9-0521-000 000	F	3	SCREW, CROSS-RECESS	
	4	XB4-7260-507 000	F	1	SCREW, M2.6x5	
	4	YG9-5094-000 000	C	1	RELAY HOLDER ASS'Y	
	4	YG9-5095-000 000	C	1	RELAY LENS ASS'Y	
	4	YG9-5096-000 000	B	1	ZOOM RING ASS'Y	
	4	YG9-5119-000 000	C	1	SWITCH, INFINITY	
	4	YH7-0027-000 000	C	1	AF MOTOR	
	4	YH7-0028-000 000	C	1	PZ MOTOR	
	4	YH8-0012-000 000	C	1	IG METER	
	4	YN1-0235-000 000	C	1	LOW PASS FILTER	
		Y22-2619-000 000	B	1	IC SC407624FU	
	10	Y22-8012-000 000	B	1	LED GL452S	
	8	Y22-8120-000 000	B	1	SENSOR, DEW	
	10	Y22-8121-000 000	B	2	PHOTO IC SPI-315-25-CD	
	10	Y22-8123-000 000	B	2	PHOTO TRANSISTOR EE-P109	

CONTENTS

CHAPTER IV. DIAGRAMS

Guide to diagrams

1. Color coding

(1) Single lines in block diagrams

Camera and DSP section

Red	(———)	: Y
	(– – – –)	: C

Video section

Red	(———)	: Recording
	(– – – –)	: Playback

(2) Voltage on circuit diagrams

Red	: Recording
Black	: Playback

(3) Signal lines in circuit diagrams

Camera section

Red		: Power supply line
Blue		: Luminance signal
Orange		: Chrominance signal
Gray	(▒▒▒▒)	: Luminance + Chromiannce signals

Recorder section

Blue	(———)	: Capstan PWM signal
	(—·—)	: Capstan ATF signal
	(– – – –)	: Capstan FG signal
Orange	(———)	: Drum PWM signal
	(– – – –)	: Drum FG signal
	(—·—·)	Drum PG singal

Syscon-servo section

Red	(———)	: Drum servo signal
	(– – – –)	: Capstan servo signal

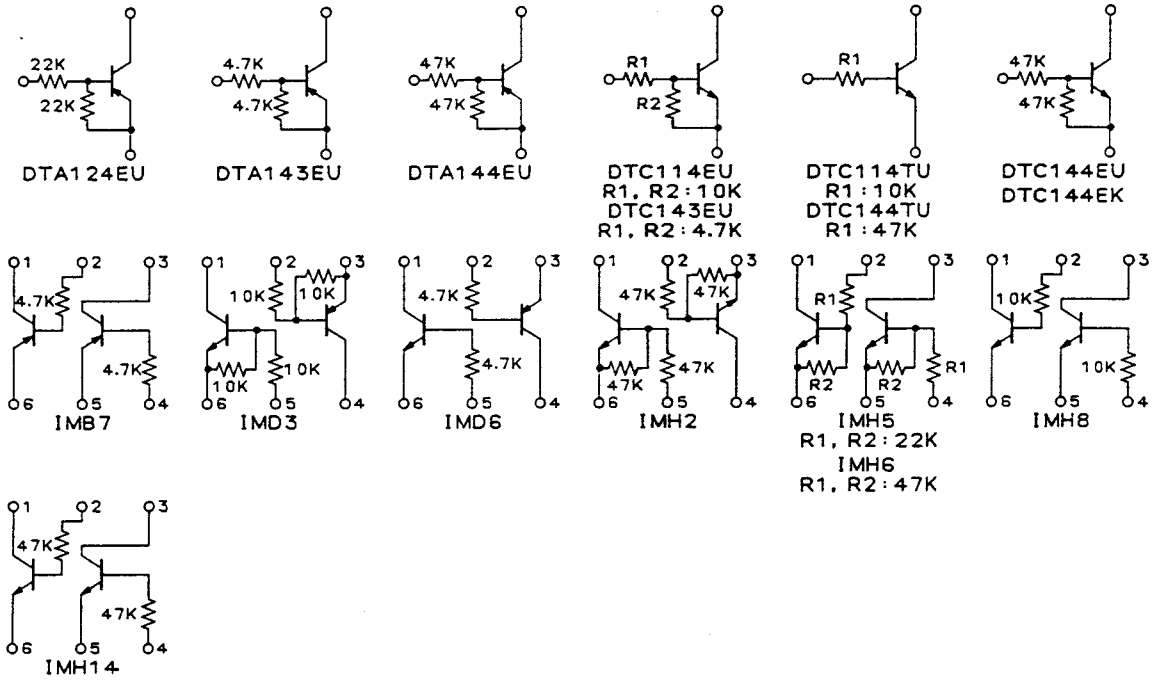
Recorder section

Gray	(▒▒▒▒)	: Recording luminance + Chrominance signals
	(▒▒▒▒)	: Playback luminance + Chrominance signals
Blue	(———)	: Recording luminance signal
	(– – – –)	: Playback luminance signal
	(—·—·)	: Capstan ATF signal
Orange	(———)	: Recording chrominance signal
	(– – – –)	: Playback chrominance signal
Red	(———)	: Recording audio signal
	(– – – –)	: Playback audio signal

(4) PC board layout

Orange	:	Component side
Netted black (▒▒▒▒)	:	Soldering side
Black	:	Parts on component side
Blue	:	Parts on soldering side

2. Equivalent circuits of digital transistor



3. Indications on circuit diagram

Resistance is represented in ohms (Ω).
Capacitance is represented in farads (F).
Voltages of capacitor are 25 V unless otherwise specified.
Wattage of resistor is 1/16 W unless otherwise specified.
Voltages are measured with a digital voltmeter.
Waveform photographs are taken by using a 10:1 probe.
IC No. in each C.B.A.s are listed on the bottom of diagrams.
No. colored in blue are corresponded to the No. of waveform photographs.
Voltage values indicated in circuit diagram are based on the following condition.

Camera section
Color bar, standard angle of view

Recorder section
Recording : Color bar (pattern generator)
Playback : Self-recording playback (Color bar)

INTERCONNECTION DIAGRAM

Note : The enclosing lines of each C.B.A. (—— and - - - -) indicate the replaceability of elements on C.B.A.

: Elements are replaceable.

: Elements are not replaceable.
For repairing, replace the C.B.A. as a unit.

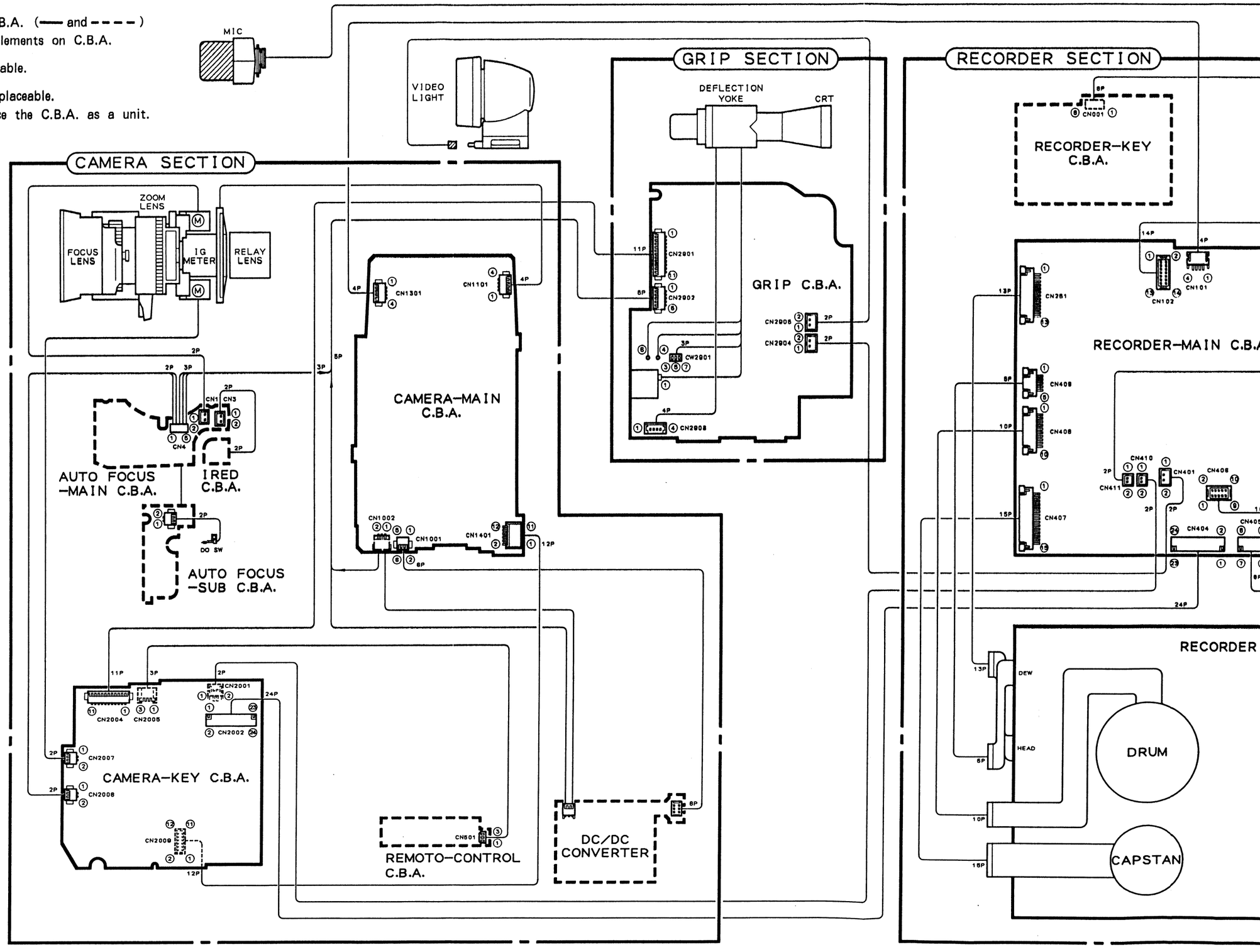
CAMERA-KEY C.B.A.
CN2001
1 UNREG 6V
2 GND
CN2002
1 PLAY LED
2 KEY 3
3 CAMERA LED
4 KEY 4
5 POWER SW (L)
6 GND
7 EJECT SW (L)
8 EVF VIDEO
9 RESET (L)
10 PB-RF DET (H)
11 SERVO REQ
12 PB-RF DET (L)
13 SERVO-CS
14 CG (VIDEO)
15 SERVO WP
16 CG BLK
17 CLOCK 2
18 EVER 6V
19 S-DATA
20 EVER 8V
21 S-DATA
22 SS 5V
23 SS ON (L)
24 SS 8V
CN2004
1 LITHIUM 3V
2 TRIG. SW (L)
3 TELE SW (L)
4 WIDE SW (L)
5 EVF ON (L)
6 HD
7 VD
8 LIGHT CONT.
9 GND
10 CG (EVF)
11 EVF VIDEO
CN2005
1 REMOCON
2 GND
3 SS 5V
CN2007
1 TELE
2 WIDE
CN2008
1 AF ON (H)
2 GND
CN2009
1 CLOCK 1
2 C-DATA
3 C-DATA
4 E^2 PROM ON
5 CAMERA REQ
6 CAMERA-CS
7 RESET (L)
8 CAMERA ON
9 CAMERA (Y)
10 GND
11 ADJ MODE
12 GND

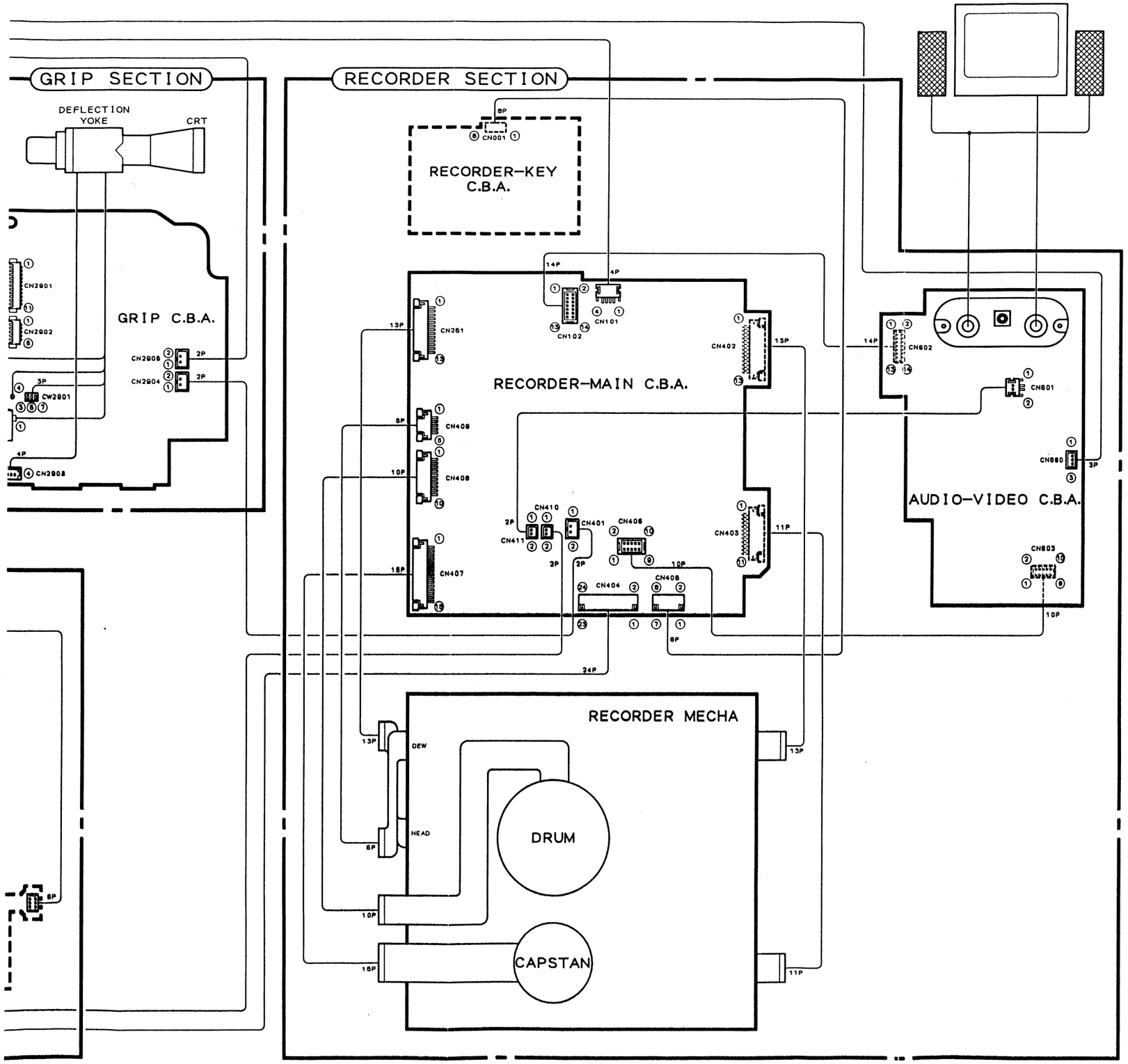
CAMERA-MAIN C.B.A.
CN1001
1 GND
2 CAMERA 5V
3 +18V
4 GND
5 -8V
6 CAMERA ON (L)
CN1002
1 GND
2 GND
CN1101
1 D+
2 C+
3 D-
4 C-
CN1301
1 CAMERA VIDEO
2 GND
3 A-FADE
4 LINE SW
CN1401
1 CLOCK 1
2 C-DATA
3 C-DATA
4 E^2 PROM ON
5 CAMERA REQ
6 CAMERA CS
7 RESET (L)
8 CAMERA ON (L)
9 CAMERA (Y)
10 GND
11 ADJ MODE
12 GND

GRIP C.B.A.
CN2901
1 LITHIUM 3V
2 TRIG. SW (L)
3 TELE SW (L)
4 WIDE SW (L)
5 EVF ON (L)
6 HD
7 VD
8 LIGHT CONT.
9 GND
10 CG (EVF)
11 EVF VIDEO
CN2902
1 GND
2 UNREG 6V
3 UNREG 6V
4 UNREG 6V
5 GND
CN2904
1 UNREG 6V
2 GND
CN2905
1 LIGHT (+)
2 LIGHT (-)
CN2906
1 H+
2 H-
3 V+
4 V-
CW2901
1 HV
3 RED
4 PINK
5 WHITE
6 BLACK
7 BLUE

REMOTE CONTROL C.B.A.
CN051
1 SS 5V
2 GND
3 REMOCON

DC/DC CONVERTER
CN1
1 UNREG 6V
2 GND
CN2
1 GND
2 CAMERA 5V
3 +18V
4 GND
5 -8V
6 CAMERA ON (L)





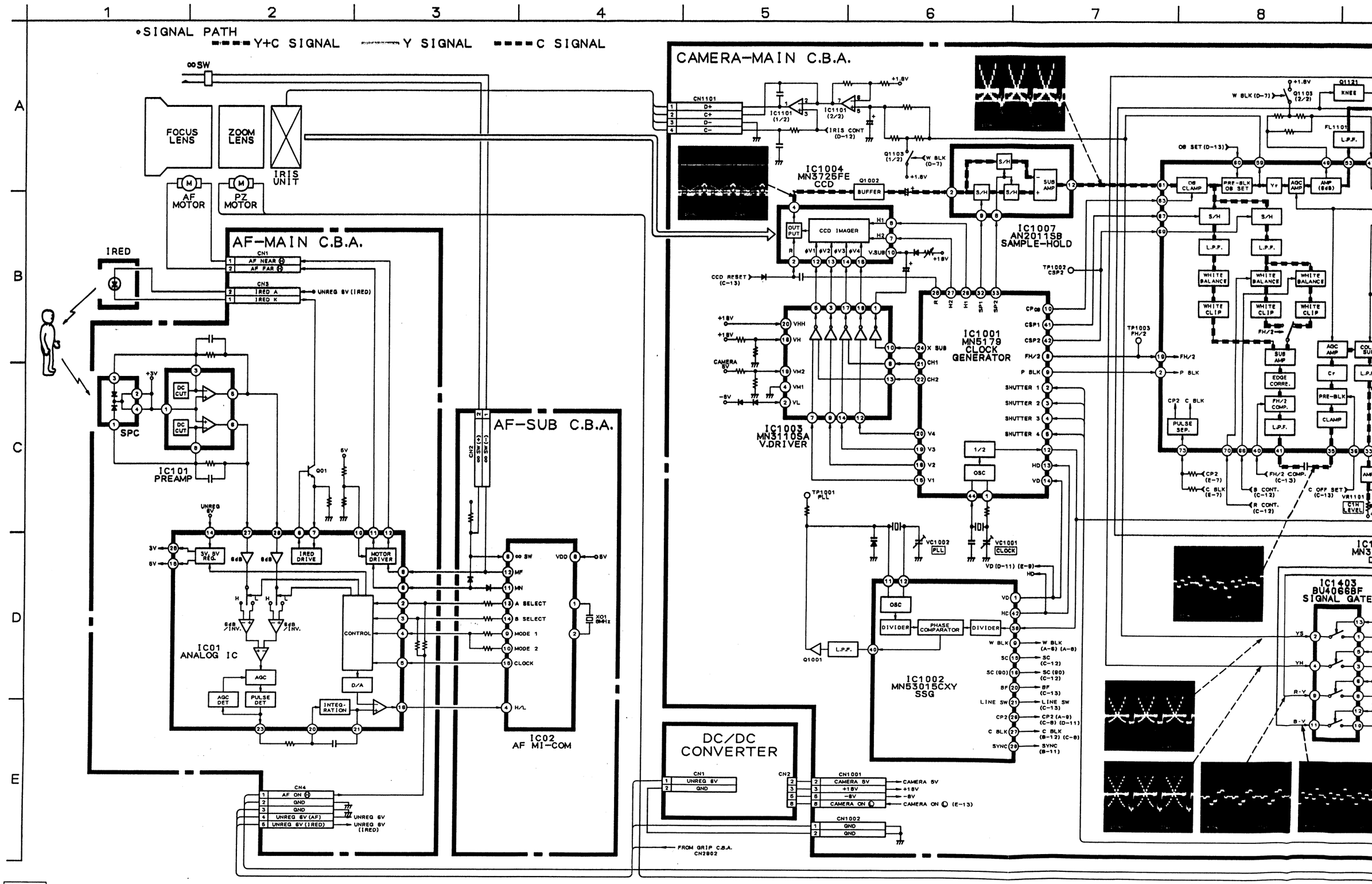
RECORDER-MAIN C.B.A.	
CN101	
1	CAMERA VIDEO
2	GND
3	A-FADE
4	LINE SW
CN102	
1	A-FADE
2	SC
3	LINE SW
4	LINE IN (L)
5	HEAD SW PULSE
6	NC
7	PB-RF (AUDIO)
8	VIDEO (AV OUT)
9	REC AFM
10	VIDEO (AV IN)
11	GND
12	VIDEO I/O
13	AV 5V
14	GND
CN251	
1	GND
2	FE HEAD
3	GND
4	GND
5	GND
6	GND
7	GND
8	CH2
9	AV 5V
10	GND
11	AV 5V
12	CH1
13	GND
CN401	
1	UNREG 6V
2	GND
CN402	
1	NC
2	SS 5V
3	NC
4	EOT SENS. (H)
5	SS 5V
6	CASSETTE DOWN (L)
7	GND
8	MODE 1
9	MODE 2
10	MODE 3
11	S REEL FG
12	SS 5V
13	S-REEL LED (-)
CN403	
1	T-REEL LED (-)
2	SS 5V
3	T REEL FG
4	SS 5V
5	BOT SENS. (H)
6	SS 5V
7	TAPE SENS. LED
8	SAFETY TAB (H)
9	HIMP (H)
10	ME (H) /MP (L)
11	SS 5V
CN404	
1	SS 5V
2	SS ON (L)
3	SS 5V
4	S-DATA
5	EVER 5V
6	S-DATA
7	EVER 5V
8	CLOCK 2
9	CG BLK
10	SERVO WP
11	CG (VIDEO)
12	SERVO-CS
13	PB-RF DET (L)
14	SERVO REQ
15	PB-RF DET (H)
16	RESET (L)
17	EVF VIDEO
18	EJECT SW (L)
19	GND
20	POWER SW (L)
21	KEY 4
22	CAMERA LED
23	KEY 3
24	PLAY LED
CN405	
1	KEY 3
2	SS 5V
3	PLAY LED
4	CAMERA LED
5	KEY 4
6	GND
7	EJECT SW (L)
8	POWER SW (L)
CN406	
1	UNREG 6V
2	GND
3	UNREG 6V
4	GND
5	AV 5V
6	GND
7	A-MUTE (H)
8	AUDIO IN (L)
9	PB (H) /EE (L)
10	SP (H) /LP (L)

RECORDER-MAIN C.B.A.	
CN407	
1	GND
2	SS 5V
3	C-FG1
4	C-FG2
5	W
6	U
7	HE-
8	V+
9	V-
10	HE+
11	U+
12	U-
13	V
14	W+
15	W-
CN408	
1	GND
2	D-PG
3	PG COM
4	D-FG
5	FG COM
6	GND
7	COM
8	W
9	V
10	U
CN409	
1	SS 5V
2	DEW (H)
3	GND
4	UNLOAD (H)
5	LOAD (H)
CN410	
1	UNREG 6V
2	GND
CN411	
1	GND
2	GND

AUDIO-VIDEO C.B.A.	
CN560	
1	GND
2	MIC
3	GND
CN601	
1	GND
2	GND
CN602	
1	A-FADE
2	NC
3	NC
4	CAMERA (H) /LINE (L)
5	HEAD SW PULSE
6	NC
7	PB-RF (AUDIO)
8	VIDEO (AV OUT)
9	REC AFM
10	VIDEO (AV IN)
11	GND
12	VIDEO I/O
13	AV 5V
14	GND
CN603	
1	UNREG 6V
2	GND
3	UNREG 6V
4	GND
5	AV 5V
6	GND
7	A-MUTE
8	NC
9	PB (H) /EE (L)
10	SP (H) /LP (L)

RECORDER-KEY C.B.A.	
CN001	
1	KEY 3
2	SS 5V
3	PLAY LED
4	CAMERA LED
5	KEY 4
6	GND
7	EJECT SW (L)
8	POWER SW (L)

BLOCK DIAGRAM CAMERA SECTION



01 May. 1991

IC1007
AN2011SB
SAMPLE-HOLD

IC1001
MN5179
CLOCK
GENERATOR

IC1002
MN53015CXY
SSG

IC1102
AN2163FHP
Y/C PROCESS

IC1006
MN3820S
DL

IC1403
BU4066BF
SIGNAL GATE

IC1301
AN2457SB
CHROMA MOD.

IC1404
M62352GP
D/A
CONVERTER

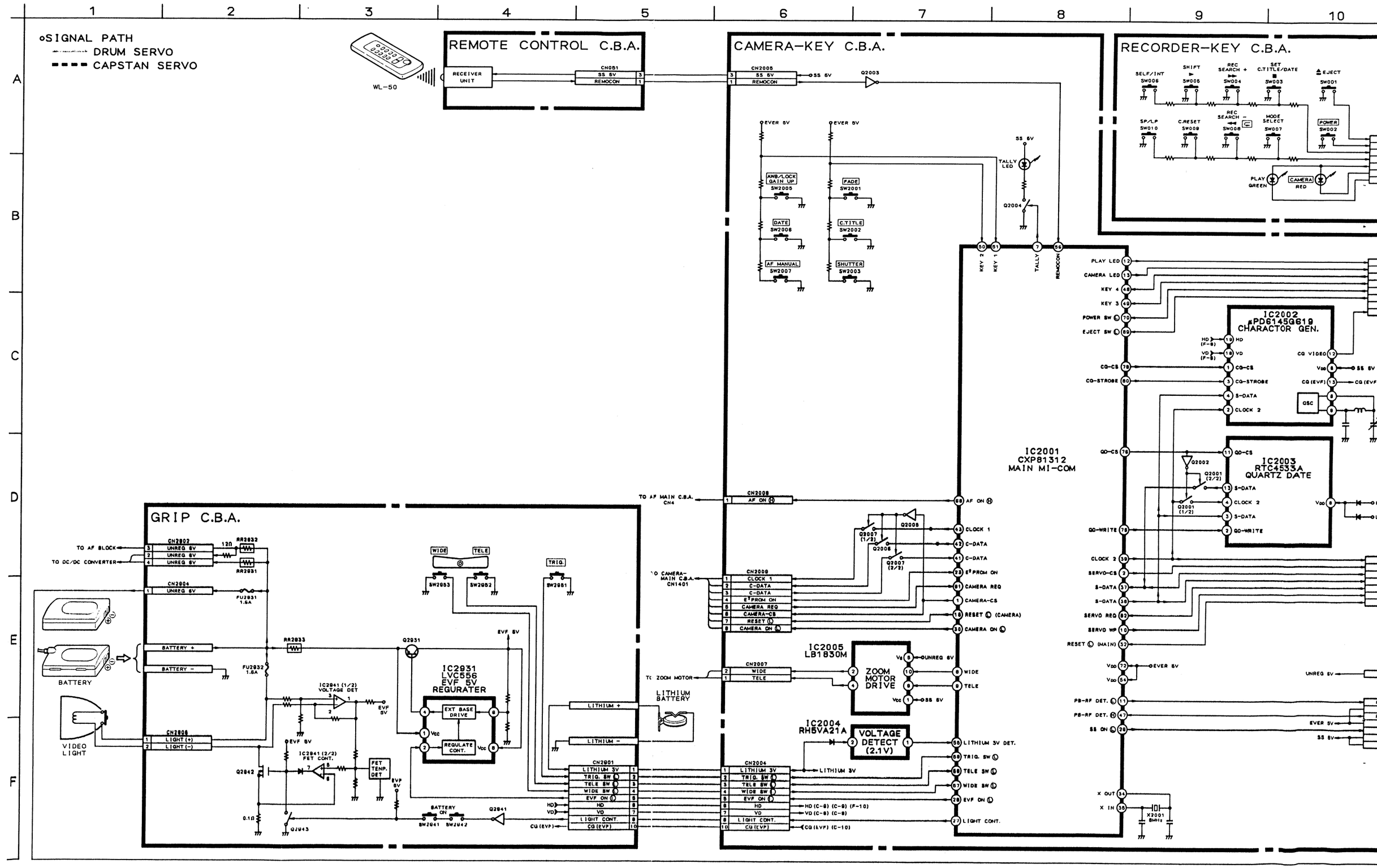
IC1405
M62352GP
D/A
CONVERTER

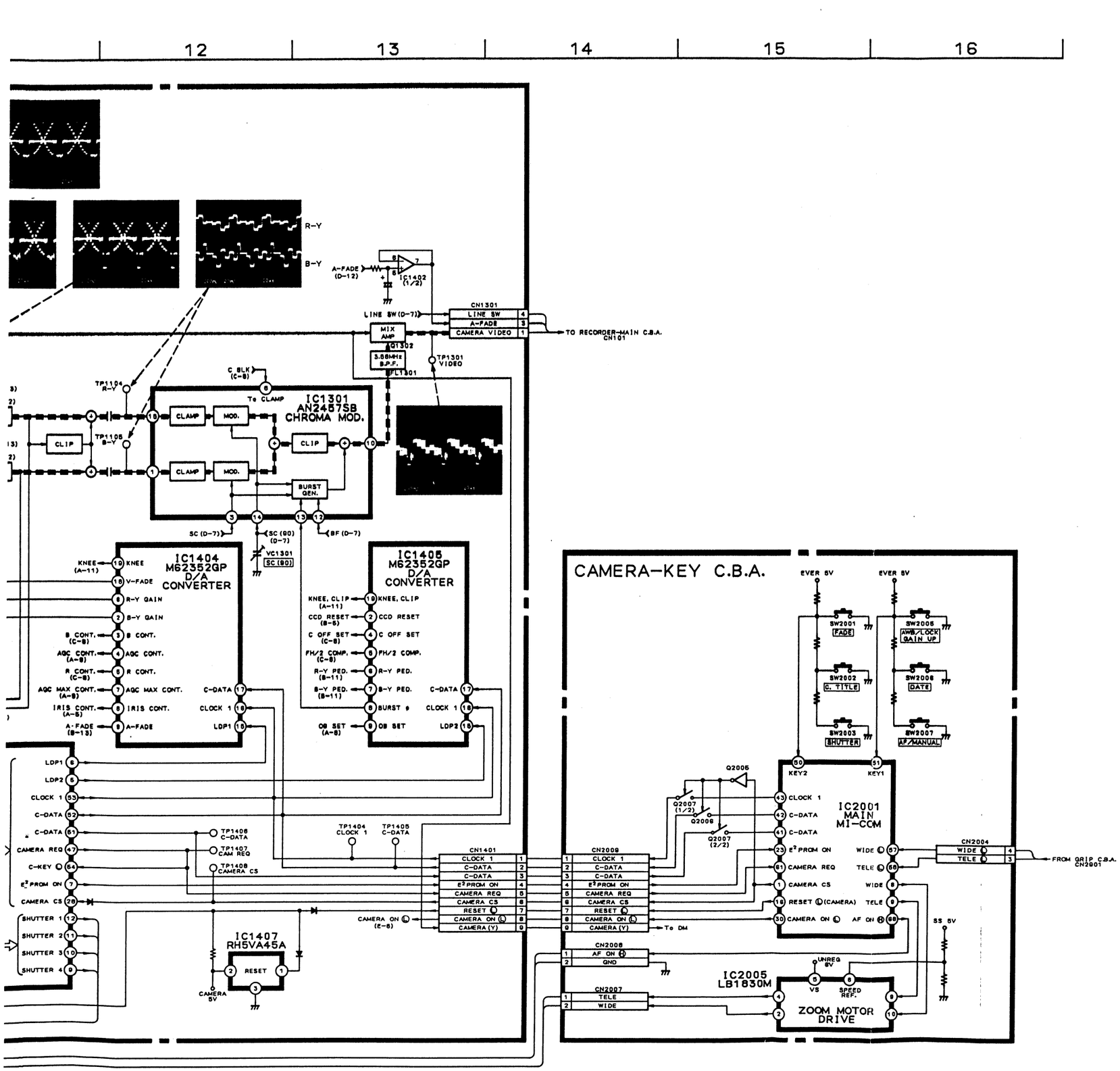
IC1406
MC68HC11
CAMERA MI-COM

IC1407
RH5VA45A

CAMERA-

BLOCK DIAGRAM SYSCON-SERVO SECTION





5 6 7 8 9 10 11 12 13 14

TROL C.B.A.

CN051
5S 5V 3
REMOCON 1

CAMERA-KEY C.B.A.

CN2005
3 5S 5V
1 REMOCON

5S 5V

Q2003

EVER 5V

EVER 5V

AWB/CLOCK/GAIN UP SW2006

FADE SW2001

DATE SW2008

C.TITLE SW2002

AF MANUAL SW2007

SHUTTER SW2003

5S 5V

TALLY LED

Q2004

KEY 2 50
KEY 1 51
TALLY 7
REMOCON 88

RECORDER-KEY C.B.A.

SELF/INT SW006
SHIFT SW005
REC SEARCH + SW004
SET C.TITLE/DATE SW003
EJECT SW001
SP/LP SW010
C.RESET SW009
REC SEARCH - SW008
MODE SELECT SW007
POWER SW002
PLAY GREEN
CAMERA RED

CN001
EJECT SW (L) 7
POWER SW (L) 8
KEY 3 1
KEY 4 6
5S 5V 2
CAMERA LED 4
PLAY LED 3

TO AUDIO-VIDEO C.B.A. CN603

RECORDER-MAIN C.B.A.
(SYSCON-SERVO SECTION)

CN406
5 AV 5V
7 A-MUTE (H)
9 PB (H) /EE (L)

CN405
7 EJECT SW (L)
8 POWER SW (L)
1 KEY 3
6 KEY 4
2 5S 5V
4 CAMERA LED
3 PLAY LED

Q417

CN2002
PLAY LED 12
CAMERA LED 13
KEY 4 48
KEY 3 49
POWER SW (L) 70
EJECT SW (L) 89
CG-CS 79
CG-STROBE 80
QD-CS 78
QD-WRITE 75
CLOCK 2 59
SERVO-CS 2
S-DATA 37
S-DATA 38
SERVO REQ 62
SERVO WP 10
RESET (L) (MAIN) 32
Vdd 73 EVER 5V
Vdd 54
PB-RF DET. (L) 11
PB-RF DET. (H) 47
5S ON (L) 20

CN2002
PLAY LED 1
CAMERA LED 3
KEY 4 4
KEY 3 2
POWER SW (L) 5
EJECT SW (L) 7
CG BLK 18
CG VIDEO 14

CN404
24 PLAY LED
22 CAMERA LED
21 KEY 4
23 KEY 3
20 POWER SW (L)
18 EJECT SW (L)
9 CG BLK
11 CG VIDEO

IC2002
μPD6145GG619
CHARACTOR GEN.

HD (F-8) 19 HD
VD (F-8) 18 VD
1 CG-CS
3 CG-STROBE
4 S-DATA
2 CLOCK 2
CG VIDEO 12
Vdd 6 5S 5V
CG (EVF) 13 CG (EVF) (F-8)
OSC 8 9

VC2001
CG SIZE

IC2001
CXP81312
MAIN MI-COM

IC2003
RTC4533A
QUARTZ DATE

Q2002
Q2001 (2/2)
Q2001 (1/2)
11 QD-CS
13 S-DATA
4 CLOCK 2
3 S-DATA
2 QD-WRITE
Vdd 8 EVER 5V
LITHIUM 3V

CN2002
CLOCK 2 17
SERVO-CS 13
S-DATA 21
S-DATA 19
SERVO REQ 11
SERVO WP 15
RESET (L) 9

CN404
8 CLOCK 2
12 SERVO-CS
4 S-DATA
6 S-DATA
14 SERVO REQ
10 SERVO WP
16 RESET (L)

CN2001
UNREG 6V 1

CN2002
PB-RF DET (L) 12
EVER 5V 18
PB-RF DET (H) 10
EVER 5V 20
5S ON (L) 23
5S 5V 22
5S 5V 24

CN404
13 PB-RF DET (L)
7 EVER 5V
15 PB-RF DET (H)
5 EVER 5V
2 5S ON (L)
3 5S 5V
1 5S 5V

EVER 5V
5S 5V
X401 8MHz
5S 5V
VR401 SW POINT
UNREG 6V

IC401
CXP80116
SERVO MI-COM

A-MUTE (H) 8
Vdd 54
Vdd 72
X OUT 34
X IN 36
SW POINT ADJ. 60
BATT. DET 45
AV ON (L) 50
FE ON (L) 76
SW PULSE 1 75
SW PULSE 2 77
JOG VD 18
JOG (H) 4
PB (H) /EE (L) 3
C-SYNC 58
ME (H) /MP (L) 10
VIDEO-CS 85
RESET (L) 32
HEAD SW PULSE 2
CLOCK 2 43
S-DATA 42
S-DATA 41
SERVO REQ 68
SERVO WP 70

ATF LOCK (L) 69
TS 8 78
SEL 2 90

Q407 (1/2)
Q405 (1/2)
AV 5V
EVER 5V DET. ON
Q407 (2/2)
Q408
AV 5VQ
Q408, 409

CN404
1 UNREG 6V
9 CG(VIDEO)
7 CG BLK
10 FE ON (L)
18 SW PULSE 1
17 SW PULSE 2
24 RF-PB (H)
19 AV ON (L)
11 JOG VD
12 JOG (H)
15 PB (H) /EE (L)
16 C-SYNC
19 HEAD SW PULSE
23 ME (H) /MP (L)
28 AV 5V
13 VIDEO-CS
21 S-DATA
22 CLOCK 2
26 PB-RF
5 PB-RF DET (L)

TO RECORDER-MAIN C.B.A. (VIDEO SECTION)

TP403
HEAD SW PULSE

Q410
Q411 (1/2)
Q411 (2/2)

Q418
AMP
D.C
PB-RF DET.
Q419
BUFFER

TP401
UNREG 6V
Q420
UNREG 6V

TP410
5S 5V

VR402
5S 5V

EXT BASE DRIVE
REGULATE CONT.
Vcc
Vee

IC405
LVC556
5S 5V
REGULATER

IC407
RH5VA45A
VOLTAGE DET. (4.5V)

IC406
RH5RA50A
EVER 5V REG.

TP402
GND

CN401
1 UNREG 6V

EVER 5V

TO AF MAIN C.B.A. CN4

CN2008
1 AF ON (H)

AF ON (H) 88

Q2007 (1/2)
Q2008
Q2007 (2/2)

CLOCK 1 43
C-DATA 42
C-DATA 41
E²PROM ON 23
CAMERA REQ 81
CAMERA-CS 1
RESET (L) (CAMERA) 18
CAMERA ON (L) 30

TO CAMERA-MAIN C.B.A. CN1401

CN2009
1 CLOCK 1
2 C-DATA
3 C-DATA
4 E²PROM ON
5 CAMERA REQ
6 CAMERA-CS
7 RESET (L)
8 CAMERA ON (L)

IC2005
LB1830M
ZOOM MOTOR DRIVE

Vs 6 UNREG 6V
2 10 WIDE
4 9 TELE
Vcc 1 5S 5V

TO ZOOM MOTOR

CN2007
2 WIDE
1 TELE

LITHIUM BATTERY

LITHIUM +
LITHIUM -

IC2004
RH5VA21A
VOLTAGE DETECT (2.1V)

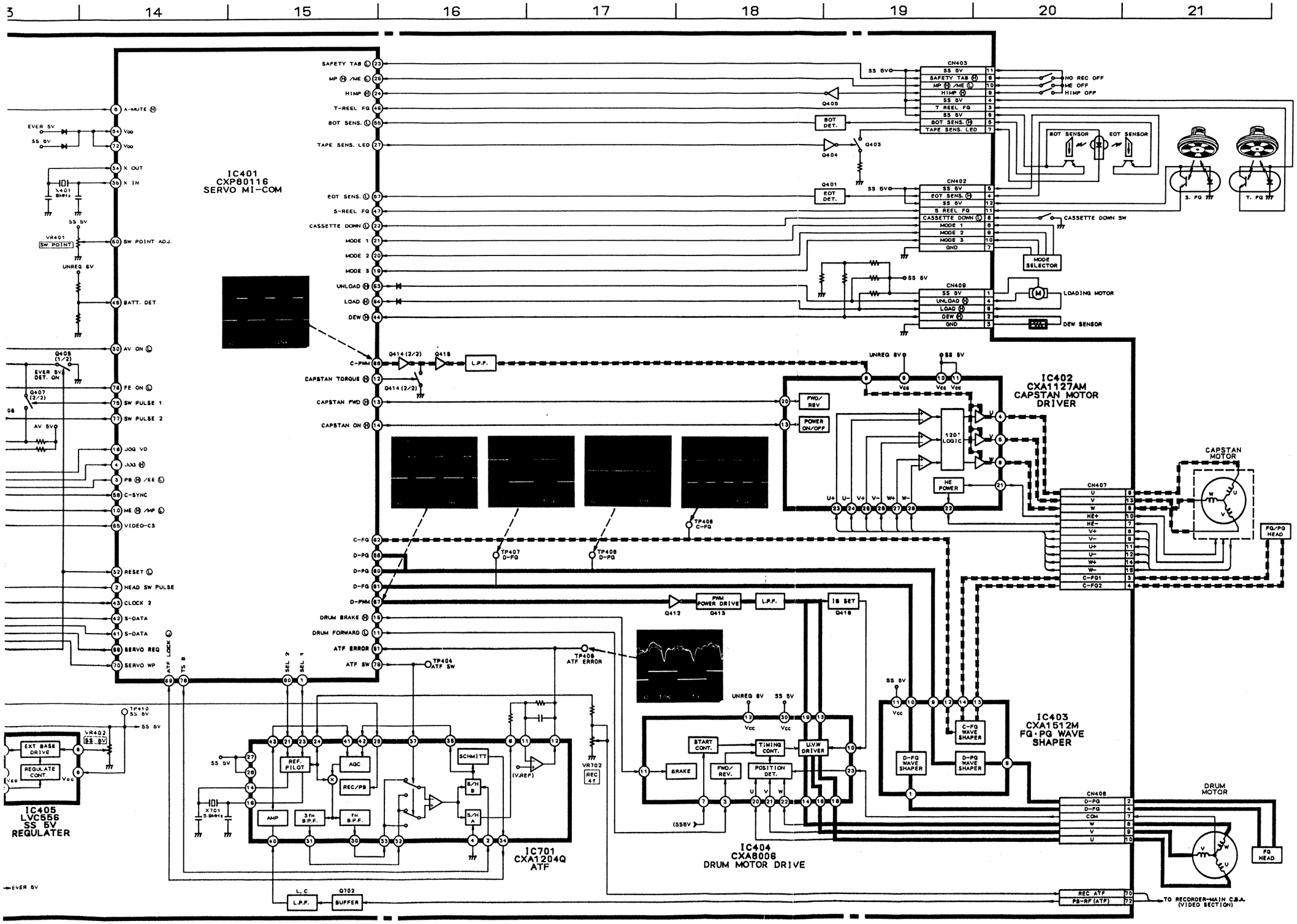
2 1 LITHIUM 3V DET. 55
TRIG. SW (L) 59
TELE SW (L) 58
WIDE SW (L) 57
EVF ON (L) 28
LIGHT CONT. 27

CN2004
1 LITHIUM 3V
2 TRIG. SW (L)
3 TELE SW (L)
4 WIDE SW (L)
5 EVF ON (L)
6 HD
7 VD
8 LIGHT CONT.
10 CG (EVF)

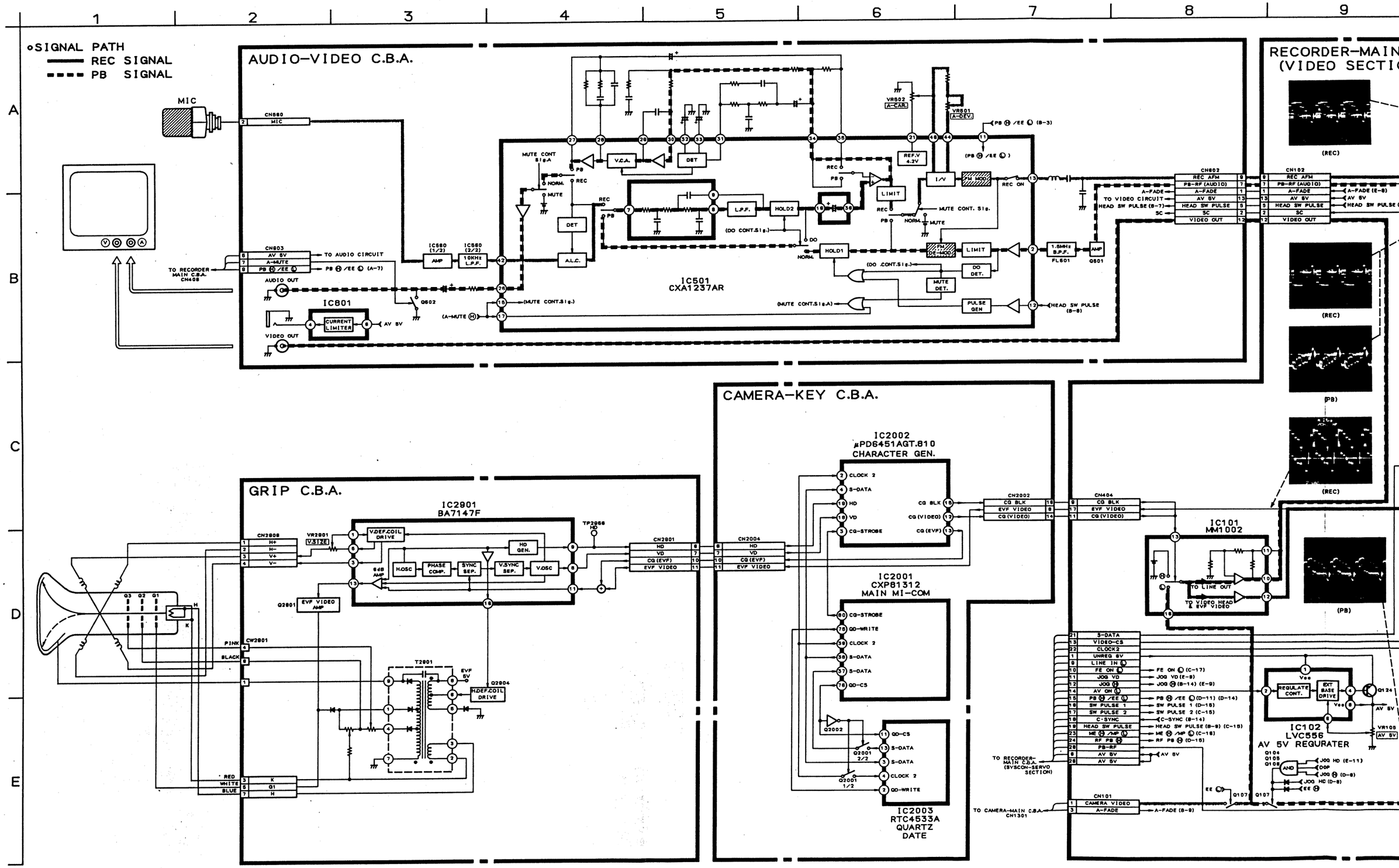
HD (C-8) (C-8) (F-10)
VD (C-8) (C-8)
CG (EVF) (C-10)

CN2001
LITHIUM 3V 1
TRIG. SW (L) 2
TELE SW (L) 3
WIDE SW (L) 4
EVF ON (L) 5
HD 6
VD 7
LIGHT CONT. 8
CG (EVF) 10

X OUT 34
X IN 36
X2001 8MHz



BLOCK DIAGRAM AUDIO-VIDEO SECTION



6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15

RECORDER-MAIN C.B.A. (VIDEO SECTION)

IC103 CXL1502M CCD DL

IC104 CXA1200AQ Y/C PROCESS

IC2002 μPD6451AGT.810 CHARACTER GEN.

IC2001 CXP81312 MAIN MI-COM

IC2003 RTC4533A QUARTZ DATE

IC101 MM1002

IC102 LVC556 AV 5V REGURATER

IC301 CXA1203N SEQ. COMP.

IC252 SC700F INV.

VR502 A-CAR.
VR501 A-DEV.
REF.V 4.2V
LIMIT
I/V
FM MOD
REC ON
MUTE CONT. Sig.
NORM.
MUTE
FM DE-MOD
LIMIT
DO DET.
MUTE DET.
PULSE GEN
1.8MHz B.P.F. FL501
AMP Q501
(DO CONT.Sig.)
(HEAD SW PULSE (B-8)
PB Ⓗ /EE Ⓛ (B-3)
(PB Ⓗ /EE Ⓛ)

CN602 / CN102

REC AFM	9	9	REC AFM
PB-RF (AUDIO)	7	7	PB-RF (AUDIO)
A-FADE	1	1	A-FADE
AV 5V	13	13	AV 5V
HEAD SW PULSE	5	5	HEAD SW PULSE
SC	2	2	SC
VIDEO OUT	12	12	VIDEO OUT

A-FADE (E-8)
AV 5V
HEAD SW PULSE (E-8)
TO VIDEO CIRCUIT
HEAD SW PULSE (B-7)

(REC) (REC) (PB) (REC) (PB) (REC) (PB) (REC) (PB) (REC) (PB) (REC) (PB) (REC)

L.P.F. 1HDL 1/2 4.43MHz B.P.F. AFC DET AFC ID 1/376 375fH VCO 1/8 APC ID DET. 743KHz FREQ. CONV. 6.17MHz 4.43MHz VXO/XO REC FREQ CONV. ACK DET. SYNC DET. BURST EMPHASIS CHROMA EMPHASIS (REC) or DE-EMPHASIS (PB) BURST DE-EMPHASIS BURST ID DET. CARRIER INVERT PHASE INVERT ACK SW ACC DET. ACC AMP DOC L.P.F. CHROMA CANCEL H.P.F. EQ 4.43MHz TRAP AGC AMP LIMIT ATT SYNC SEP. HALF H KILLER NOR. DOC CLAMP AGC DET. FM MOD LIMITER V/I CONV. SUB EMPHASIS MAIN EMPHASIS CLIP SUB DE-EMPHASIS MAIN DE-EMPHASIS 3.5V REQ. 4.2V REQ. PB C TRAP FL102 PB FREQ. CONV. 5.17MHz 4.43MHz 732KHz SHARPNESS H.P.L. FM DEMOD LIMITER B.P.F. TIME CONSTANT SWITCH MIX BUS DECORDER 5.17MHz B.P.F. FL105 X101 4.43MHz Q131 TRAP FREQ SW FL103 C EMPHASIS TRAP Q803 BUFFER FL801 L.P.F. Q804 AMP 743KHz B.P.F. FL802 Q807 AMP BUFFER VR801 REC C 8.5MHz TRAP L, C PEAKING AMP BUFFER AUDIO ATF TRAP FL101 AMP Q119 BUFFER Q125 Q135 PEAKING AMP Q136 BUFFER VR108 Y/C SEP. VR108 Y LEVEL VR107 V DEV. VR103 REC Y VR108 V CAR VR251 REC A-FM

IC301 internal: TH/DL DUMMY CONV1 SEQUENCE DET. MAIN SW MODE PB REC JOG AFC HD VCO S/H 1/2 L.P.F. -90° ×2 ϕ SWD 1/2FH BF GATE 1/2FH

IC102 internal: REGULATE CONT. EXT BASE DRIVE Q124 AV 5V VR105 AV 5V

IC101 internal: TO LINE OUT TO VIDEO HEAD & EVF VIDEO

CN2002 / CN404

CG BLK	15	9	CG BLK
EVF VIDEO	8	17	EVF VIDEO
CG (VIDEO)	14	11	CG (VIDEO)

CG BLK
CG (VIDEO)
CG (EVF)
CLOCK 2
S-DATA
HD
VD
CG-STROBE

CN404

21	S-DATA	
13	VIDEO-CS	
22	CLOCK2	
1	UNREG 6V	
9	LINE IN Ⓛ	
10	FE ON Ⓛ	FE ON Ⓛ (C-17)
11	JOG VD	JOG VD (E-9)
12	JOG Ⓗ	JOG Ⓗ (B-14) (E-8)
14	AV ON Ⓛ	
15	PB Ⓗ /EE Ⓛ	PB Ⓗ /EE Ⓛ (D-11) (D-14)
16	SW PULSE 1	SW PULSE 1 (D-16)
17	SW PULSE 2	SW PULSE 2 (C-15)
18	C-SYNC	C-SYNC (B-14)
19	HEAD SW PULSE	HEAD SW PULSE (B-9) (C-16)
23	ME Ⓗ /MP Ⓛ	ME Ⓗ /MP Ⓛ (C-16)
24	RF PB Ⓗ	RF PB Ⓗ (D-15)
28	PB-RF	
8	AV 5V	AV 5V
26	AV 5V	

TO RECORDER-MAIN C.B.A. (SYSCON-SERVO SECTION)

CN101

1	CAMERA VIDEO	
3	A-FADE	A-FADE (B-9)

TO CAMERA-MAIN C.B.A. CN1301

Q2001 2/2 Q2001 1/2

SP Ⓗ (D-14) SP Ⓗ (C-15) D.O.C. PULSE (8±1)

HEAD SW PULSE (E-8) SW PULSE 2 (E-8) SW PULSE 1 (E-8) RF PB Ⓗ /EE Ⓛ (E-8)

CIRCUIT BOARD DIAGRAM CAMERA-MAIN C.B.A.

< NOTICES >

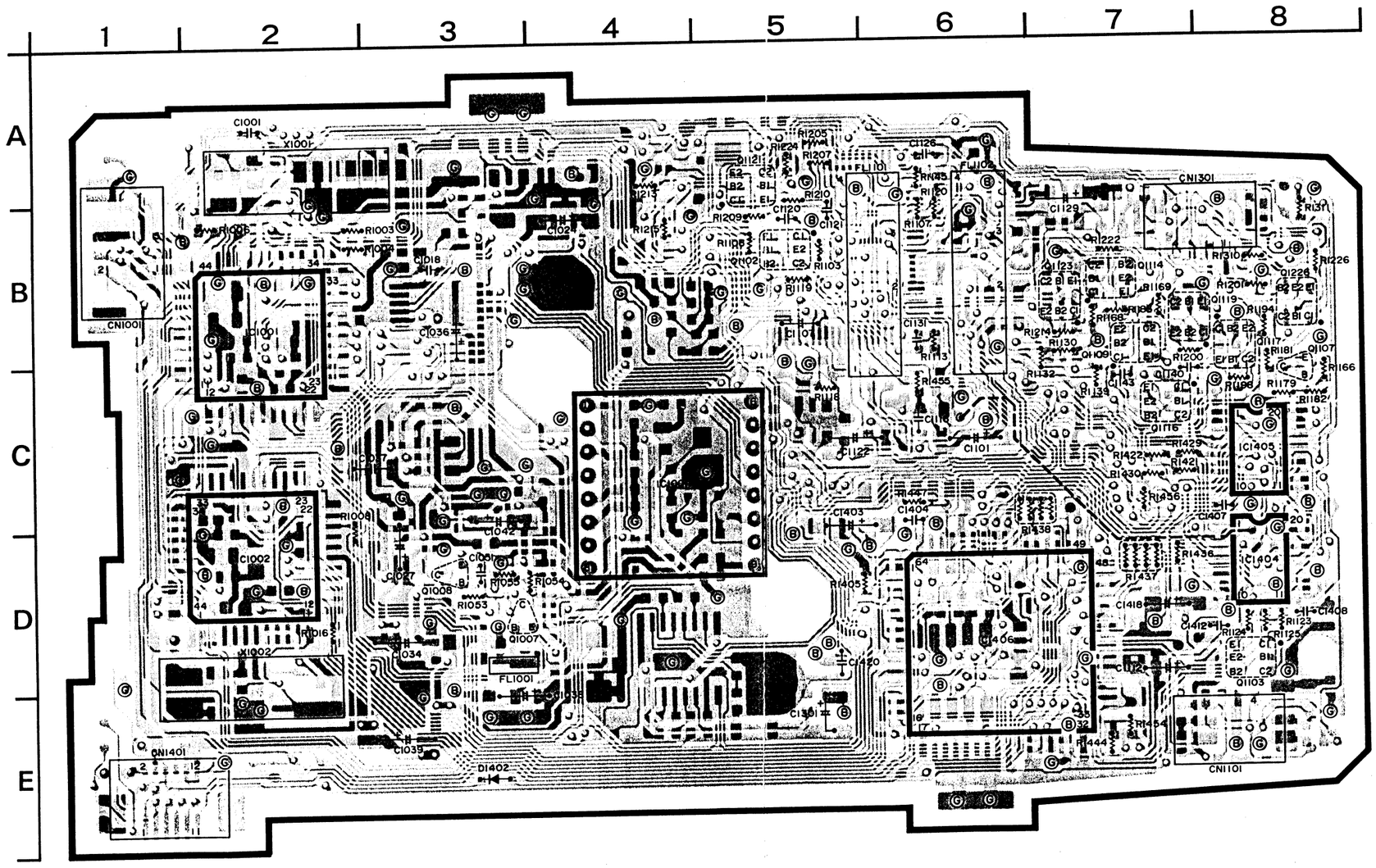
CAMERA-MAIN C. B. A. consists of four layers.
(Soldering, Component, Ground and Camera 5V patterns.)

1) Through-hole marks on each C. B. A. denote :
   - ○ : Soldering side ⟷ Component side
   - Ⓖ : Soldering side (Component side) ⟷ Ground
   - Ⓑ : Soldering side (Component side) ⟷ Camera 5V

2) Blue lines on Component side indicate signal pattern of Ground (– – – –) /Camera 5V (————) patterns.

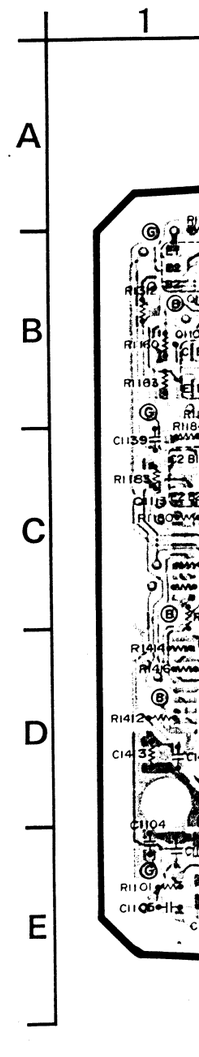
CAMERA-MAIN C.B.A.(COMPONENT SIDE)

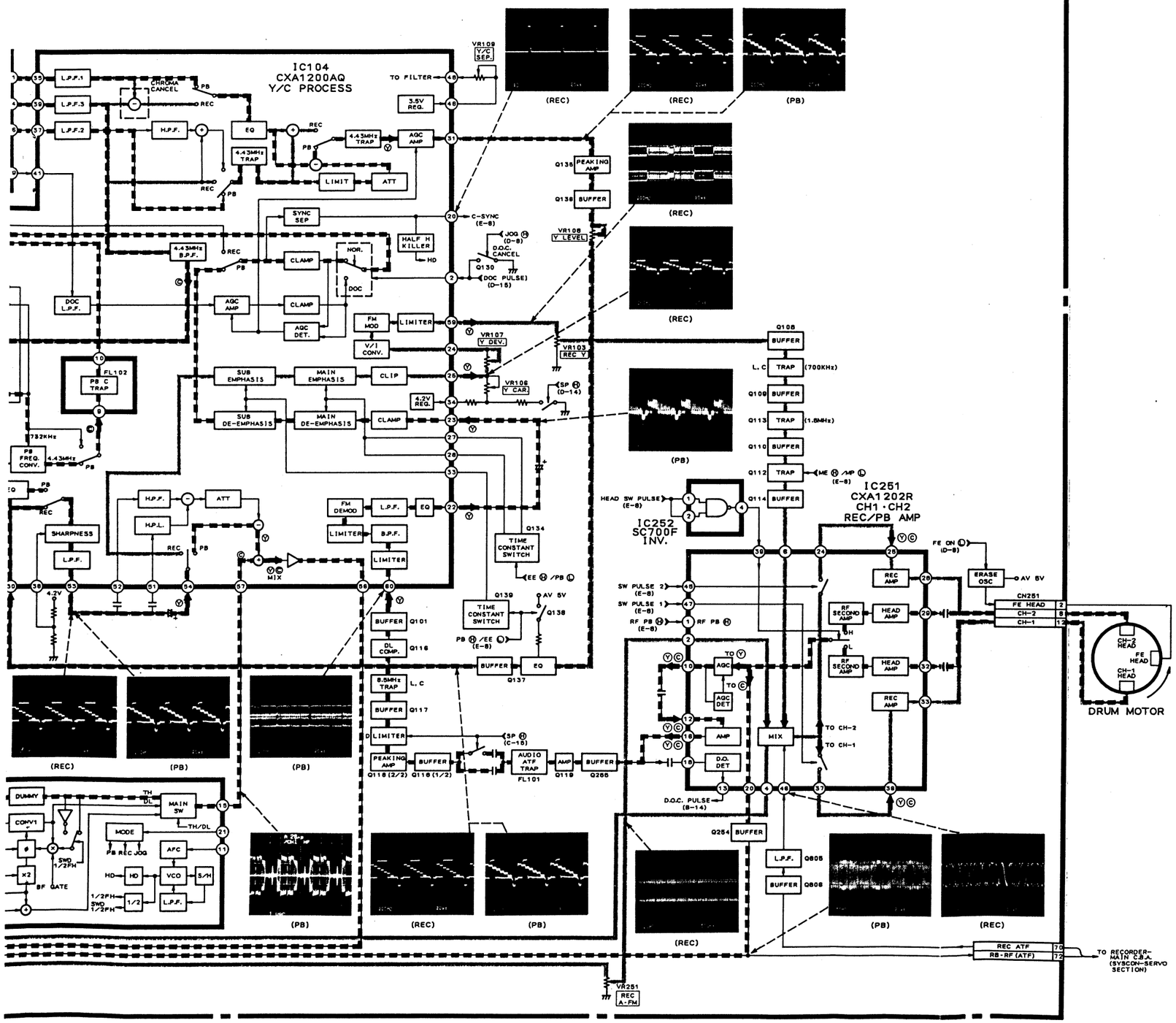
D1402	E-3
IC1001	B-2
IC1002	D-2
IC1404	D-8
IC1405	C-8
IC1406	D-6
Q1007	D-3
Q1008	D-3
Q1102	B-5
Q1103	D-8
Q1107	C-8
Q1109	B-7
Q1114	B-7
Q1116	C-7
Q1117	B-8
Q1119	B-7
Q1121	B-5
Q1123	B-7
Q1226	B-8



CAMERA-MAIN C.B.A.

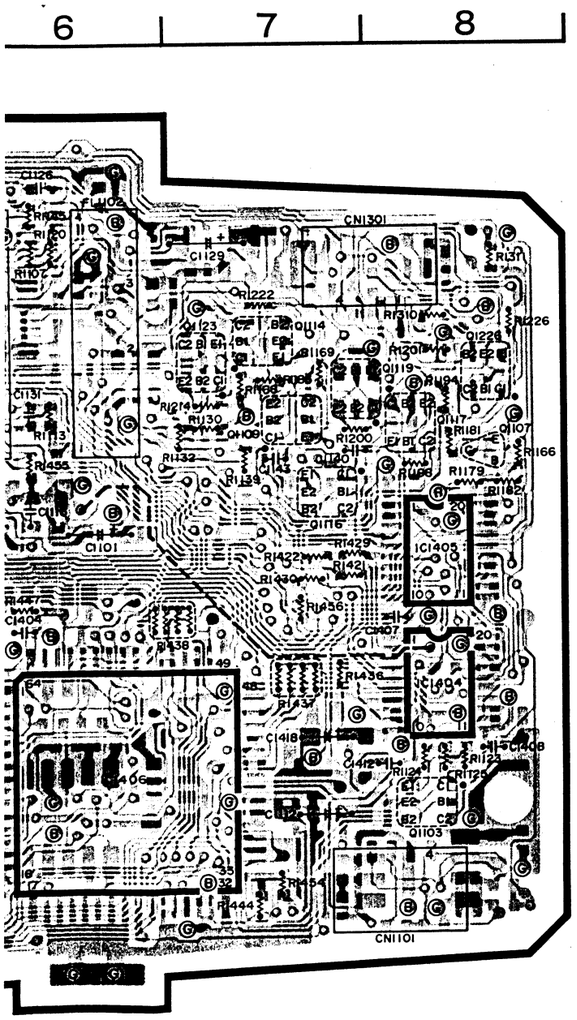
D1001	B-7
D1002	D-8
D1003	D-5
D1004	D-5
D1005	D-5
D1101	C-5
D1401	D-2
IC1003	B-6
IC1005	D-7
IC1006	B-7
IC1007	D-6
IC1101	E-2
IC1102	B-4
IC1301	D-5
IC1401	E-3
IC1402	D-2
IC1403	D-4
IC1407	D-2
Q1001	D-8
Q1002	C-6
Q1003	C-6
Q1005	B-6
Q1006	D-5
Q1104	B-2
Q1105	B-3
Q1106	B-2
Q1108	B-1
Q1110	B-3
Q1111	B-3
Q1112	C-2
Q1113	C-1
Q1115	C-2
Q1120	C-4
Q1122	B-5
Q1124	B-2
Q1125	C-3
Q1302	B-1
Q1401	D-3
Q1402	D-3
Q1403	D-3
VC1001	B-8
VC1002	D-7
VC1301	D-5
VR1001	C-5
VR1101	B-2



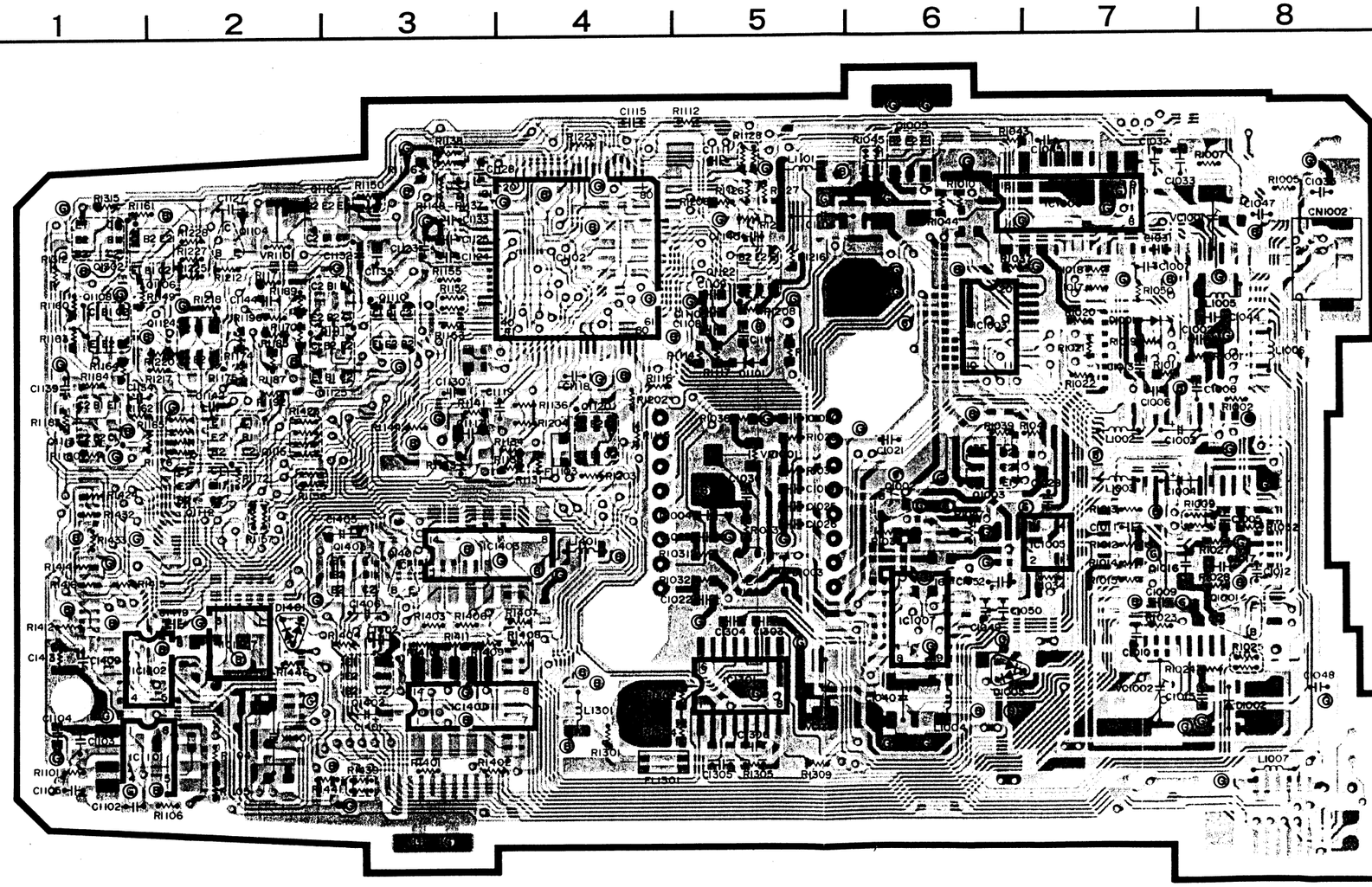


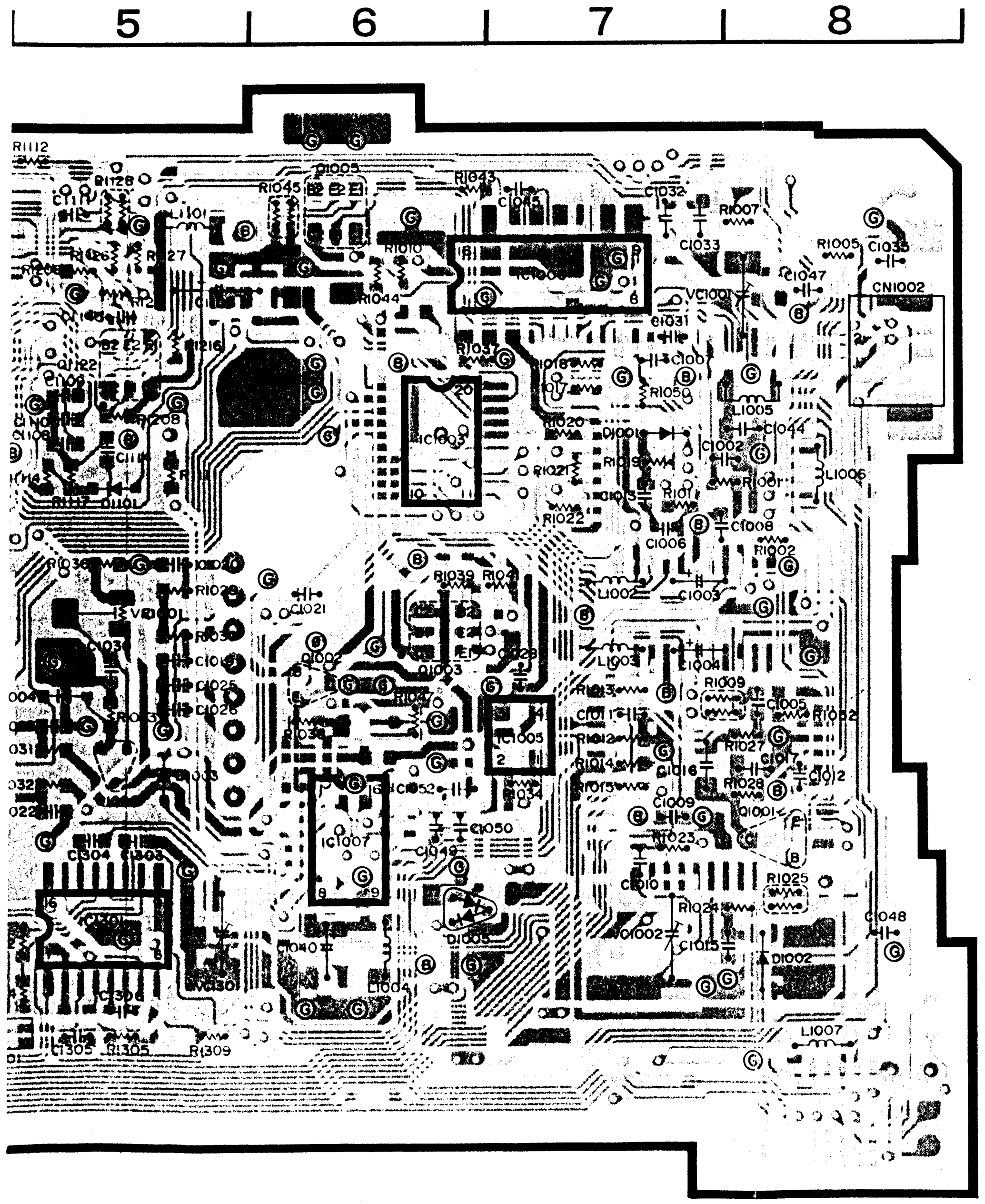
AMERA-MAIN C. B. A. consists of four layers.
Soldering, Component, Ground and Camera 5V patterns.)
hrough-hole marks on each C. B. A. denote :
: Soldering side ⟷ Component side
) : Soldering side (Component side) ⟷ Ground
) : Soldering side (Component side) ⟷ Camera 5V
lue lines on Component side indicate signal pattern of
round (– – – –) /Camera 5V (———) patterns.

CAMERA-MAIN C.B.A.(SOLDERING SIDE)

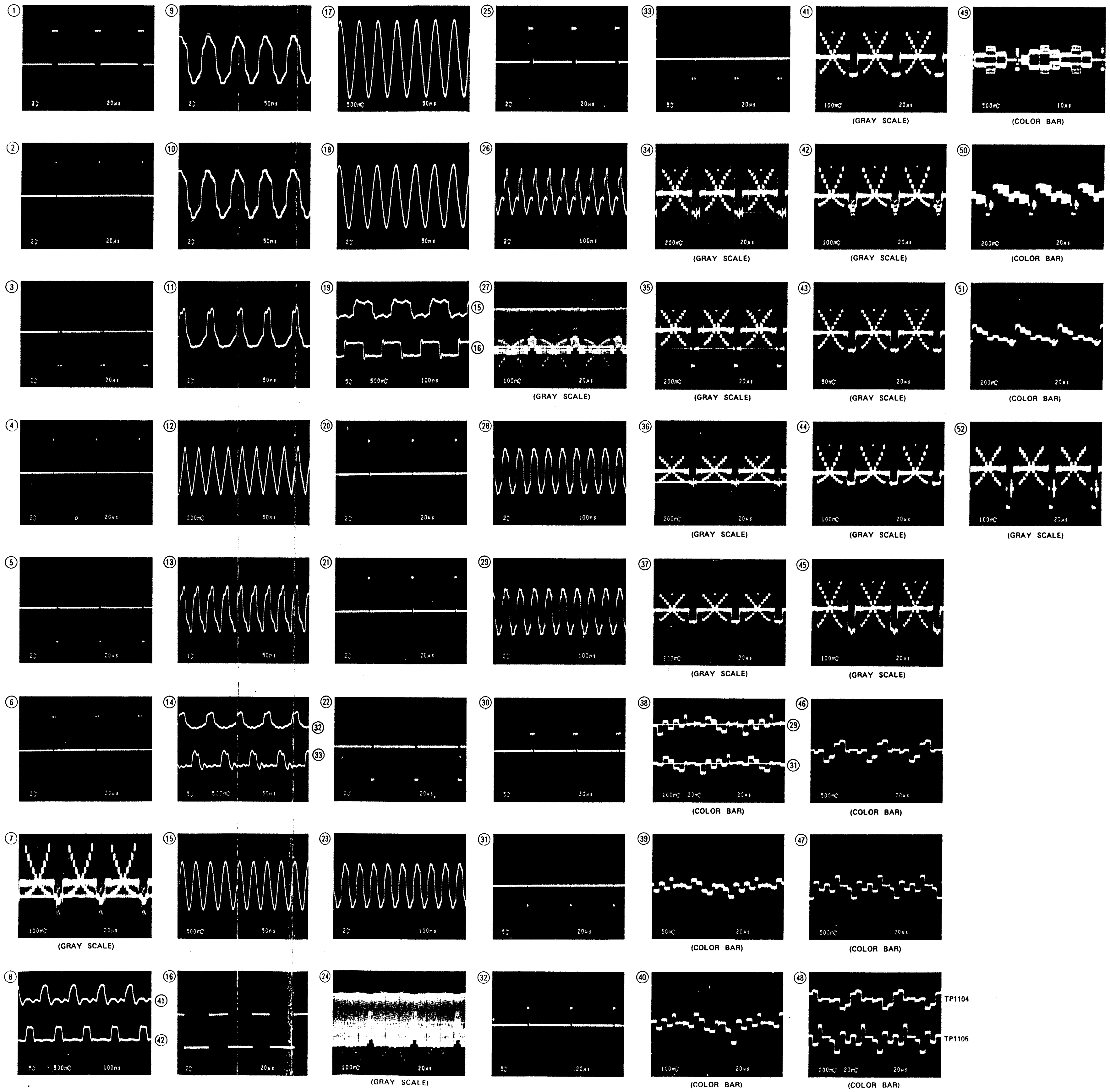


D1001	B-7
D1002	D-8
D1003	D-5
D1004	D-5
D1005	D-5
D1101	C-5
D1401	D-2
IC1003	B-6
IC1005	D-7
IC1006	B-7
IC1007	D-6
IC1101	E-2
IC1102	B-4
IC1301	D-5
IC1401	E-3
IC1402	D-2
IC1403	D-4
IC1407	D-2
Q1001	D-8
Q1002	C-6
Q1003	C-6
Q1005	B-6
Q1006	D-5
Q1104	B-2
Q1105	B-3
Q1106	B-2
Q1108	B-1
Q1110	B-3
Q1111	B-3
Q1112	C-2
Q1113	C-1
Q1115	C-2
Q1120	C-4
Q1122	B-5
Q1124	B-2
Q1125	C-3
Q1302	B-1
Q1401	D-3
Q1402	D-3
Q1403	D-3
VC1001	B-8
VC1002	D-7
VC1301	D-5
VR1001	C-5
VR1101	B-2





SIGNAL WAVEFORMS



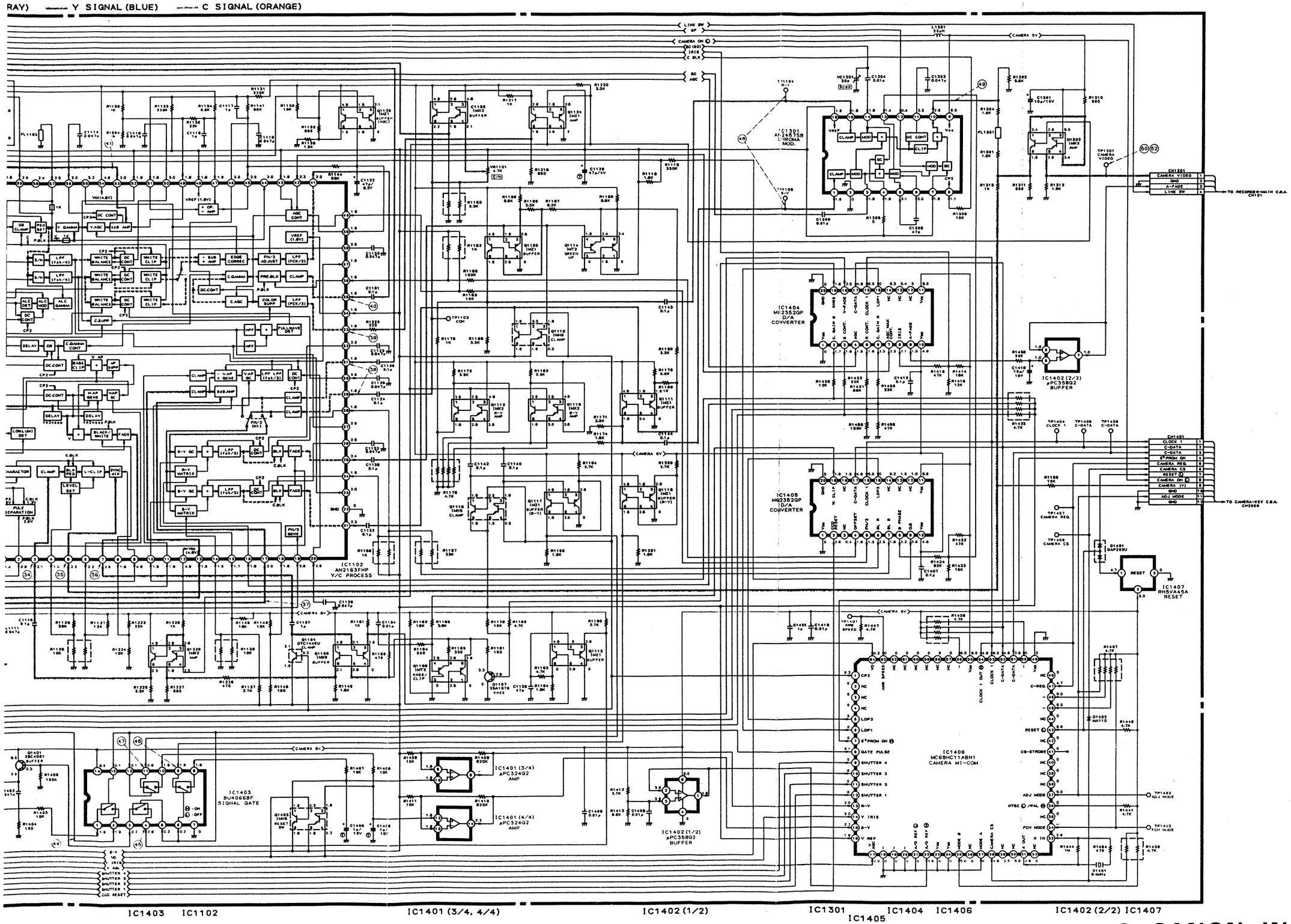
SCHEMATIC DIAGRAM CAMERA-MAIN C.B.A.

○SIGNAL PATH ····· Y+C SIGNAL (GRAY) ——— Y SIGNAL (BLUE) ——— C SIGNAL (ORANGE)

CAMERA-MAIN C.B.A.

IC1003 IC1004 IC1001 | IC1005 | IC1101 (1/2) IC1002 IC1007 | IC1006 | IC1101 (2/2) | IC1401 (1/4, 2/4) | IC1403 | IC1102

RAY) Y SIGNAL (BLUE) C SIGNAL (ORANGE)

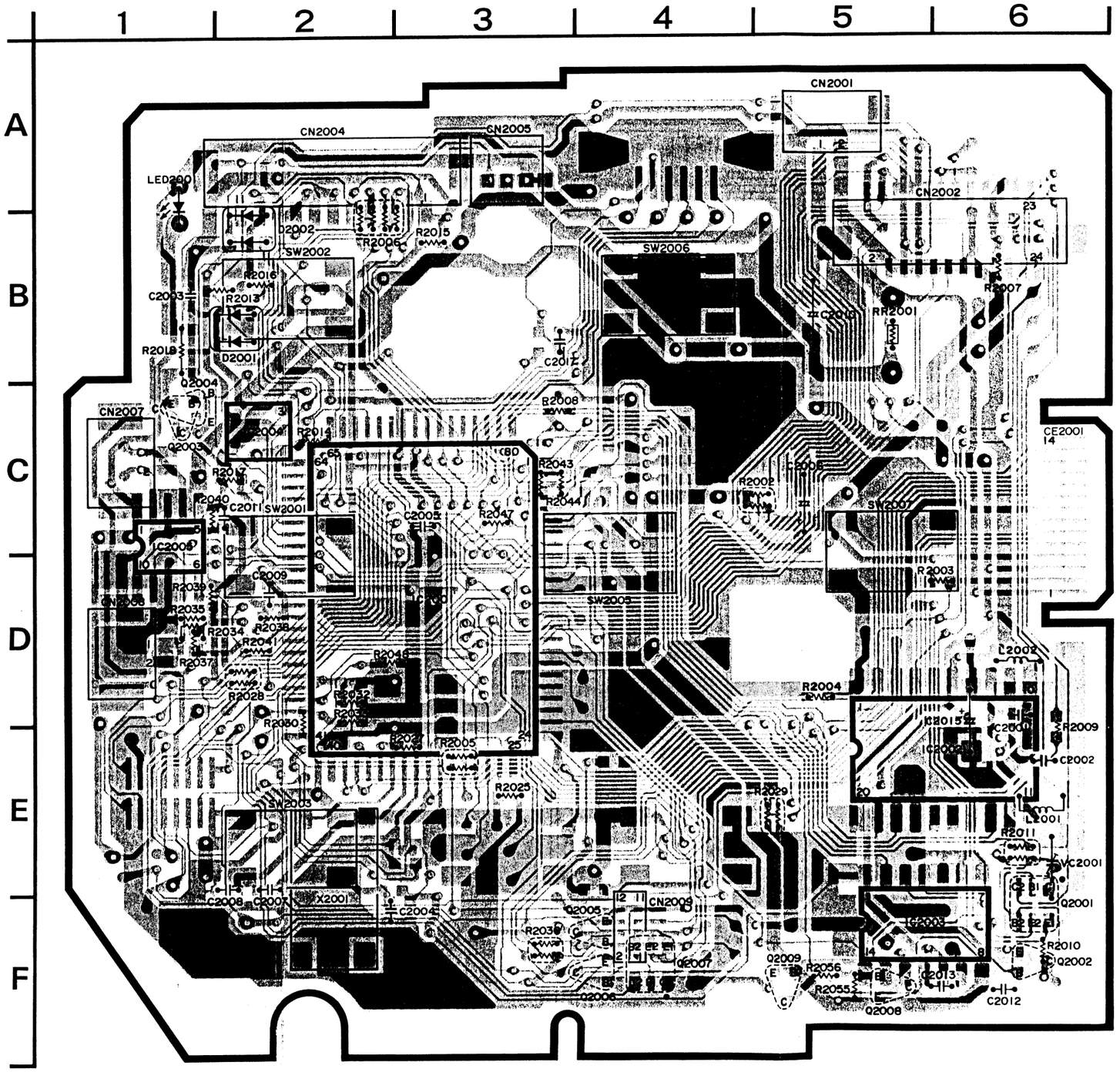


IC1403 IC1102 IC1401 (3/4, 4/4) IC1402 (1/2) IC1301 IC1404 IC1406 IC1402 (2/2) IC1407
IC1405

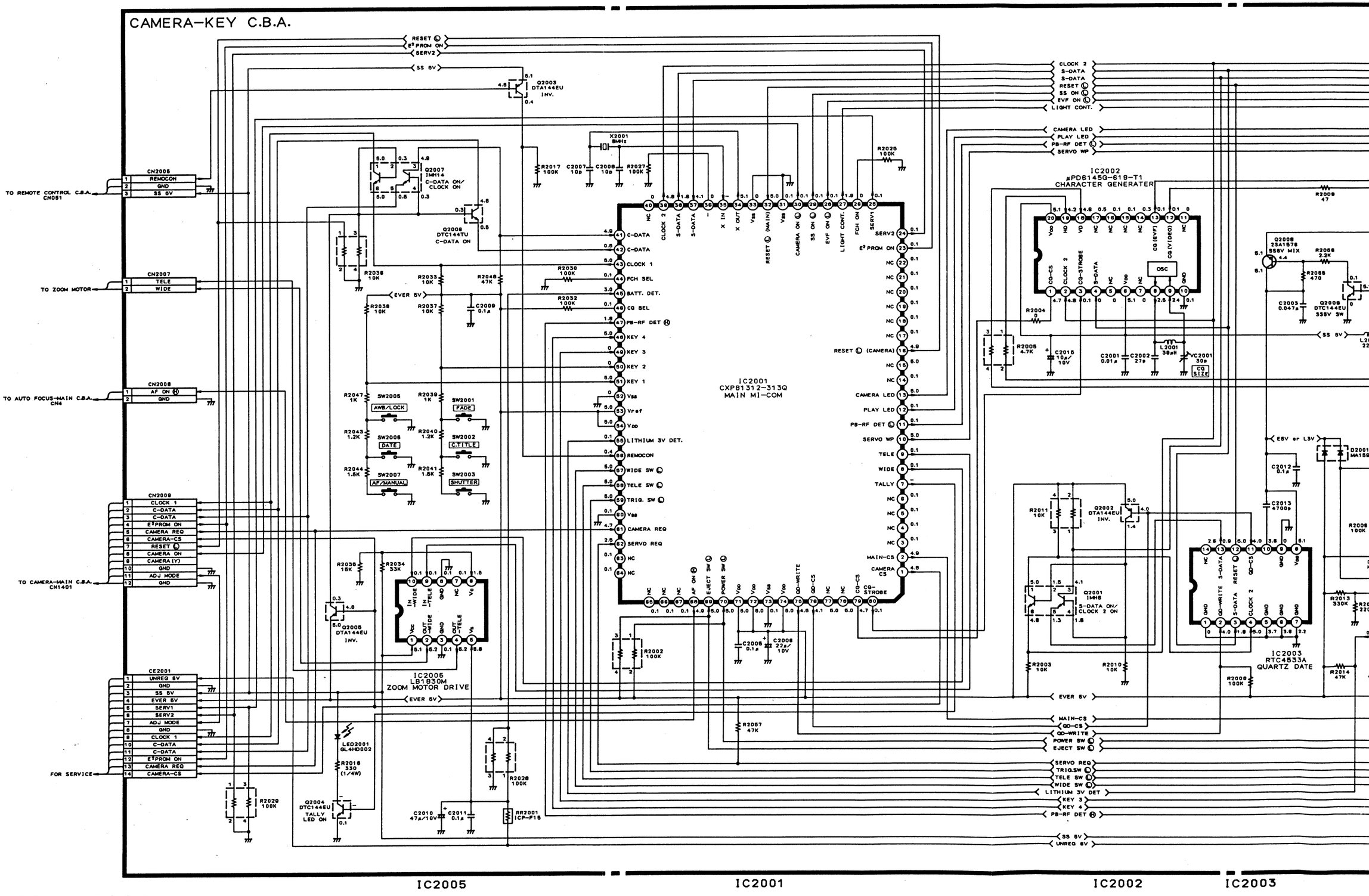
CIRCUIT BOARD DIAGRAM CAMERA-KEY C.B.A.

CAMERA-KEY C.B.A.

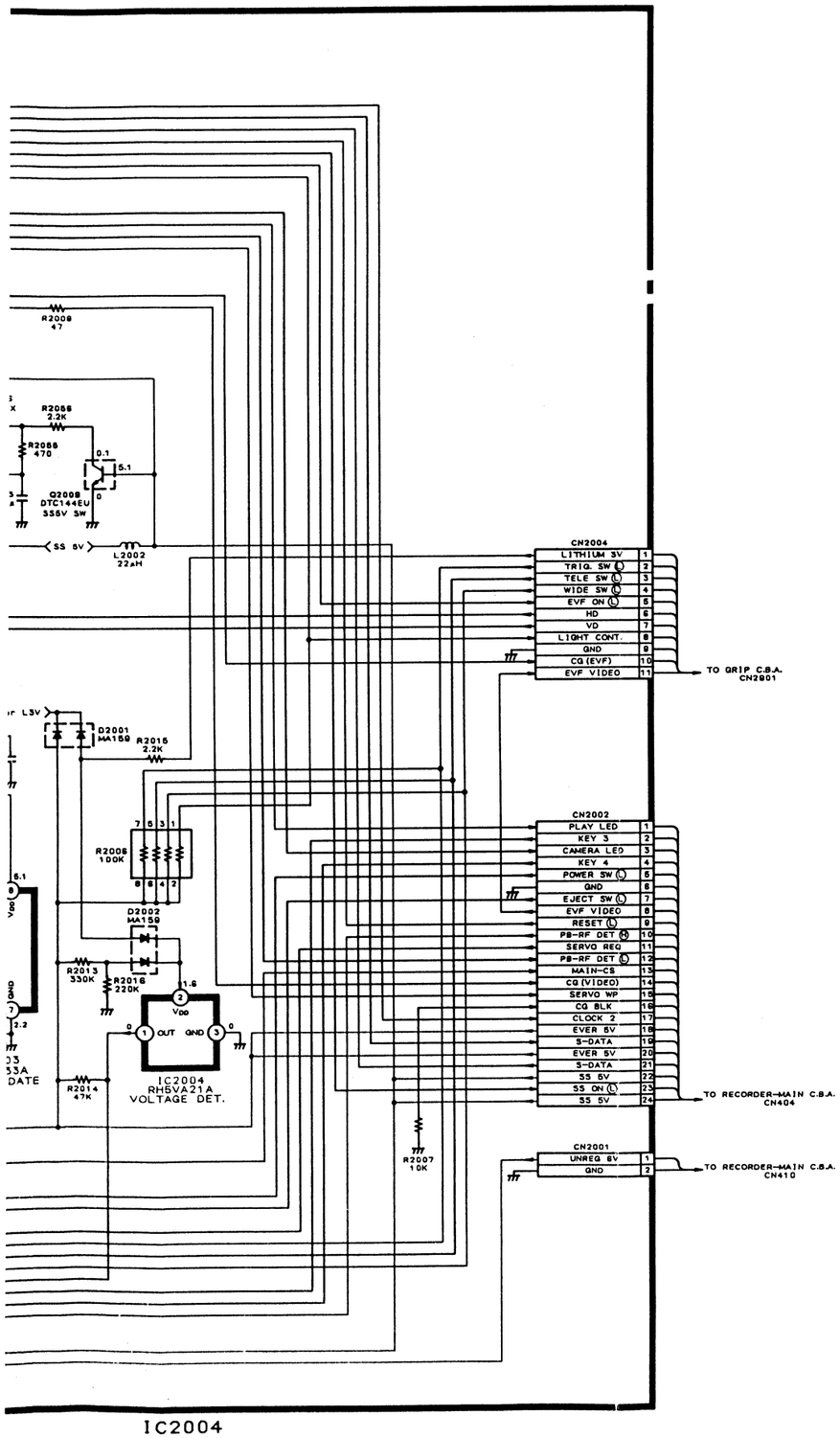
D2001	B-2
D2002	B-2
IC2001	D-3
IC2002	E-6
IC2003	F-5
IC2004	C-2
IC2005	C-1
Q2001	F-6
Q2002	F-6
Q2003	C-1
Q2004	C-1
Q2005	F-4
Q2006	F-4
Q2007	F-4
Q2008	F-5
Q2009	F-5
VC2001	E-6



SCHEMATIC DIAGRAM CAMERA-KEY C.B.A.



01 May. 1991



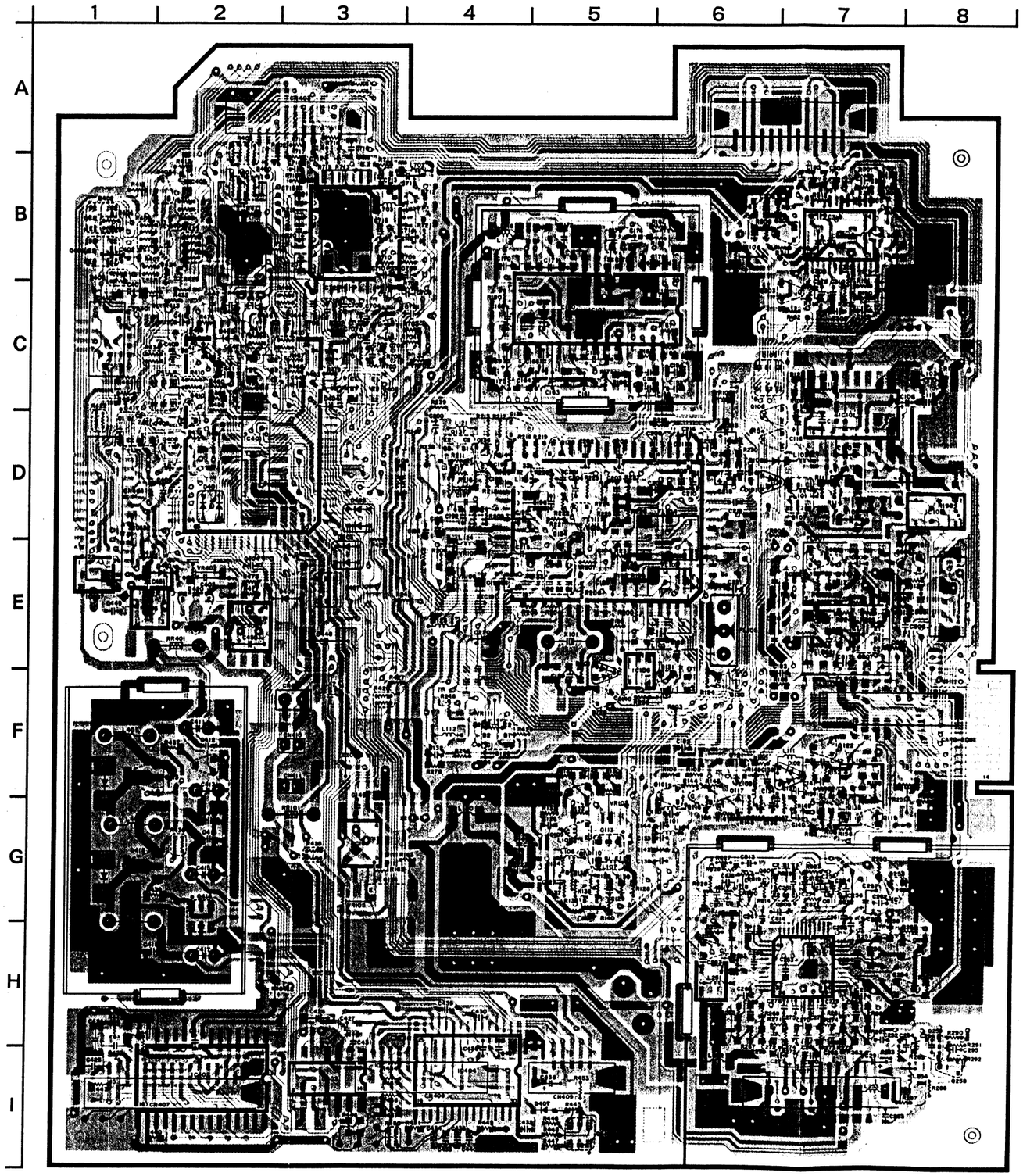
IC2004

CIRCUIT BOARD DIAGRAM RECORDER-MAIN C.B.A.

RECORDER-MAIN C.B.A.
(COMPONENT SIDE)

D101	D-7
D102	F-7
D103	F-5
D104	D-3
D108	D-7
D301	B-8
D401	D-2
D402	D-3
D403	E-3
D404	C-3
D405	F-1
D406	G-1
D407	I-5
D408	C-2
D409	E-3
D410	E-2
IC101	D-7
IC102	G-3
IC103	C-5
IC104	D-5
IC105	D-8
IC106	F-5
IC251	H-7
IC252	H-6
IC301	B-7
IC401	D-2
IC402	I-2
IC403	I-3
IC404	I-4
IC405	E-2
IC406	E-1
IC407	E-1
IC701	B-2
Q101	G-6
Q104	D-7
Q105	C-6
Q106	D-7
Q107	D-7
Q108	G-5
Q109	G-5
Q110	G-5
Q112	G-5
Q113	G-5
Q114	G-5
Q116	G-6
Q117	G-6
Q118	F-7
Q119	G-7
Q121	F-6
Q122	F-7
Q124	G-3
Q126	F-4
Q130	F-6
Q131	F-6
Q132	F-5

Q133	E-5
Q134	E-5
Q135	D-4
Q136	D-4
Q137	D-4
Q138	D-5
Q139	D-5
Q140	F-5
Q252	H-6
Q253	G-8
Q254	H-8
Q255	H-8
Q258	I-8
Q259	H-8
Q302	B-7
Q303	C-7
Q401	B-1
Q402	B-1
Q403	B-2
Q404	B-2
Q405	C-3
Q406	E-3
Q407	E-3
Q408	D-2
Q409	D-1
Q410	D-2
Q411	C-2
Q412	F-2
Q413	F-1
Q414	G-2
Q415	G-2
Q416	I-5
Q417	D-1
Q418	C-2
Q419	C-2
Q420	E-2
Q702	C-3
Q803	E-8
Q804	E-7
Q805	G-7
Q806	G-6
Q807	E-7
VR103	G-5
VR104	B-7
VR105	G-3
VR106	E-4
VR107	E-4
VR108	D-4
VR109	C-6
VR111	F-4
VR251	F-8
VR401	C-1
VR402	E-2
VR702	C-4
VR801	E-7



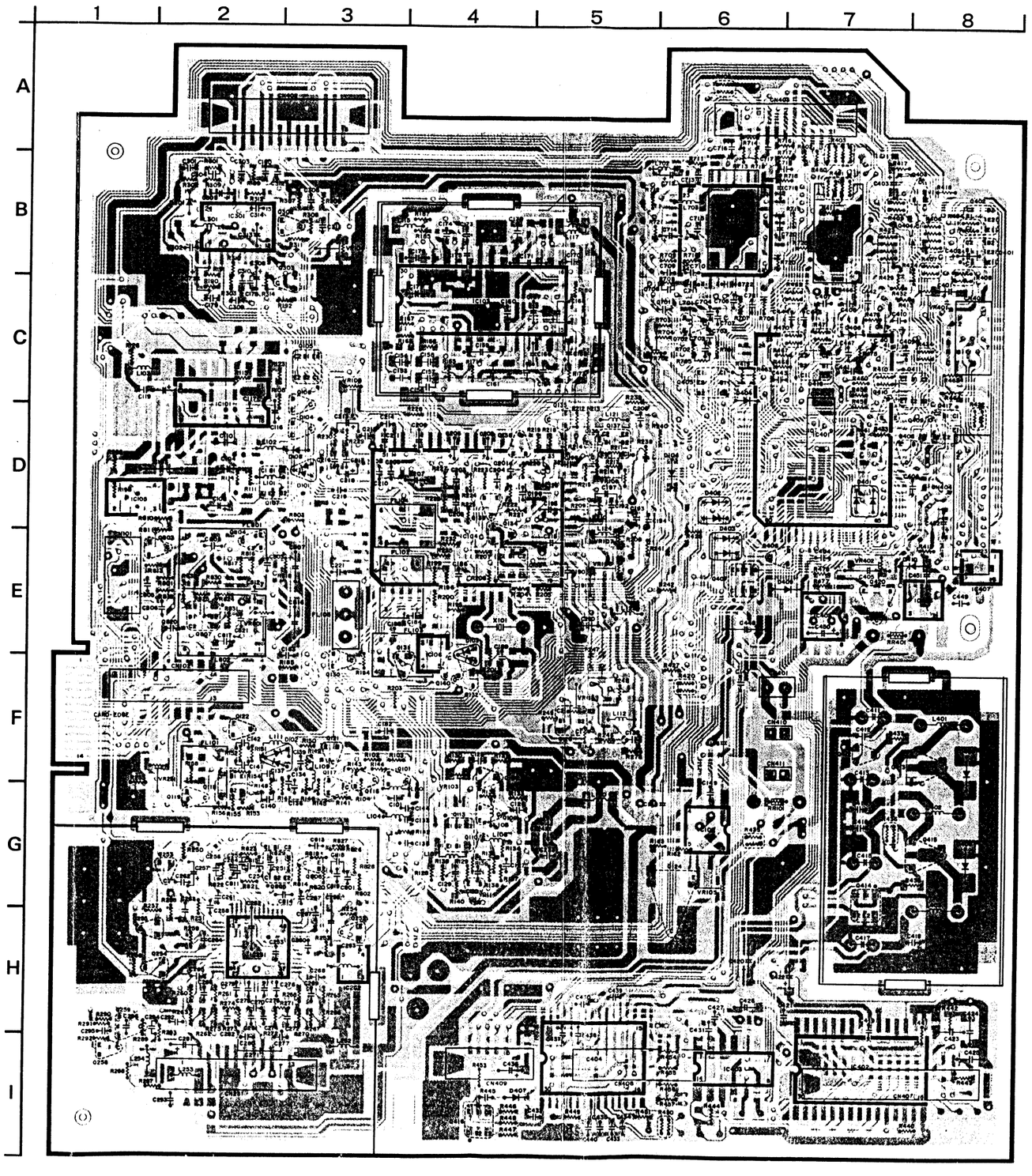
RECORDER-
(SOLDERI

D101	D-3
D102	F-3
D103	F-4
D104	D-6
D108	D-3
D301	B-2
D401	D-7
D402	D-6
D403	E-6
D404	C-6
D405	F-8
D406	G-8
D407	I-5
D408	C-7
D409	E-7
D410	E-8
IC101	D-2
IC102	G-6
IC103	C-4
IC104	E-4
IC105	D-1
IC106	F-4
IC251	H-2
IC252	H-3
IC301	B-2
IC401	D-7
IC402	I-7
IC403	I-6
IC404	I-5
IC405	E-7
IC406	E-8
IC407	E-8
IC701	B-6
Q101	G-4
Q104	D-3
Q105	C-3
Q106	D-3
Q107	D-2
Q108	G-4
Q109	G-4
Q110	G-4
Q112	G-4
Q113	G-4
Q114	G-4
Q116	G-3
Q117	G-3
Q118	F-2
Q119	G-2
Q121	F-3
Q122	F-2
Q124	G-6
Q126	F-5
Q130	F-3
Q131	F-4
Q132	F-4

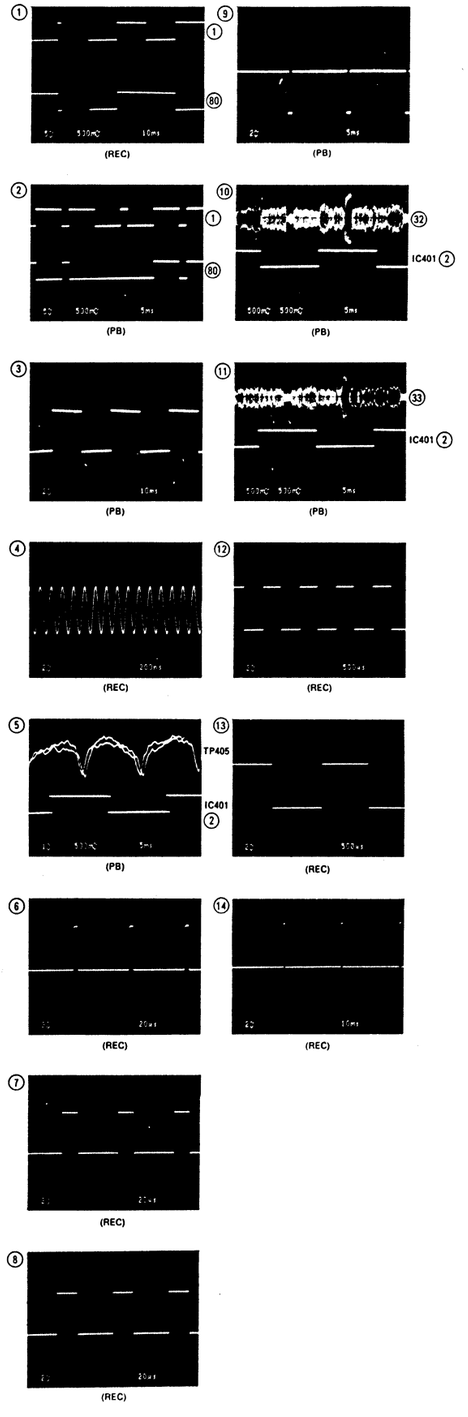
RECORDER-MAIN C.B.A. (SOLDERING SIDE)

D101	D-3
D102	F-3
D103	F-4
D104	D-6
D108	D-3
D301	B-2
D401	D-7
D402	D-6
D403	E-6
D404	C-6
D405	F-8
D406	G-8
D407	I-5
D408	C-7
D409	E-7
D410	E-8
IC101	D-2
IC102	G-6
IC103	C-4
IC104	E-4
IC105	D-1
IC106	F-4
IC251	H-2
IC252	H-3
IC301	B-2
IC401	D-7
IC402	I-7
IC403	I-6
IC404	I-5
IC405	E-7
IC406	E-8
IC407	E-8
IC701	B-6
Q101	G-4
Q104	D-3
Q105	C-3
Q106	D-3
Q107	D-2
Q108	G-4
Q109	G-4
Q110	G-4
Q112	G-4
Q113	G-4
Q114	G-4
Q116	G-3
Q117	G-3
Q118	F-2
Q119	G-2
Q121	F-3
Q122	F-2
Q124	G-6
Q126	F-5
Q130	F-3
Q131	F-4
Q132	F-4

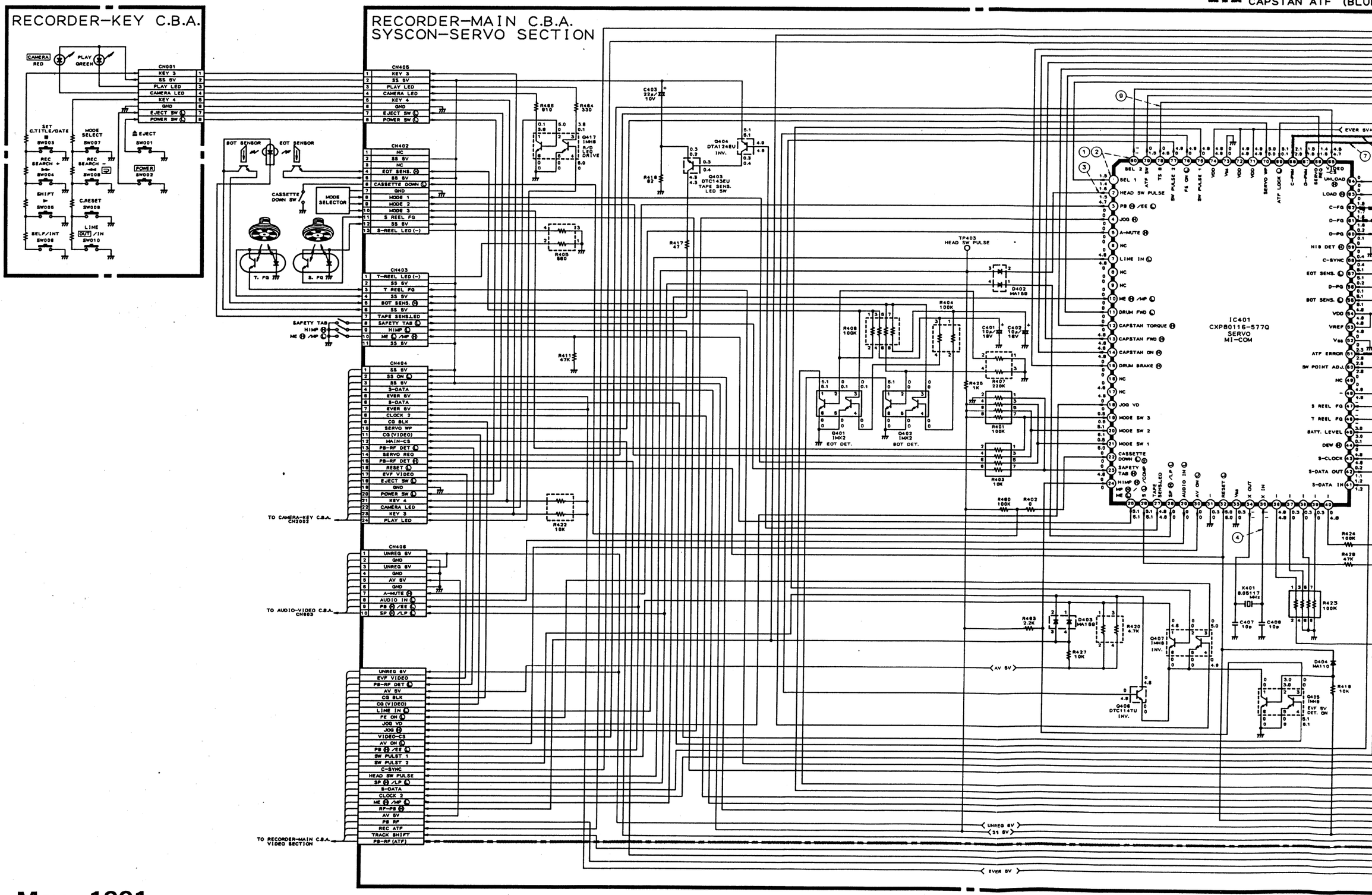
Q133	E-4
Q134	E-4
Q135	D-5
Q136	D-5
Q137	D-5
Q138	D-4
Q139	D-4
Q140	F-4
Q252	H-3
Q253	G-2
Q254	H-2
Q255	H-1
Q258	I-1
Q259	I-9
Q302	B-3
Q303	C-3
Q401	B-8
Q402	B-8
Q403	B-8
Q404	B-8
Q405	C-6
Q406	E-7
Q407	E-6
Q408	D-8
Q409	D-8
Q410	D-7
Q411	C-8
Q412	F-7
Q413	F-8
Q414	G-7
Q415	G-7
Q416	I-4
Q417	D-8
Q418	C-7
Q419	C-7
Q420	E-7
Q702	C-6
Q803	E-1
Q804	E-2
Q805	G-3
Q806	G-3
Q807	E-2
VR103	G-4
VR104	B-3
VR105	G-6
VR106	E-5
VR107	E-5
VR108	D-5
VR109	C-3
VR111	F-5
VR251	F-2
VR401	B-8
VR402	E-7
VR702	C-6
VR801	E-2



SIGNAL WAVEFORMS



SCHEMATIC DIAGRAM RECORDER-MAIN C.B.A. (SYSCON-SERVO SECTION)



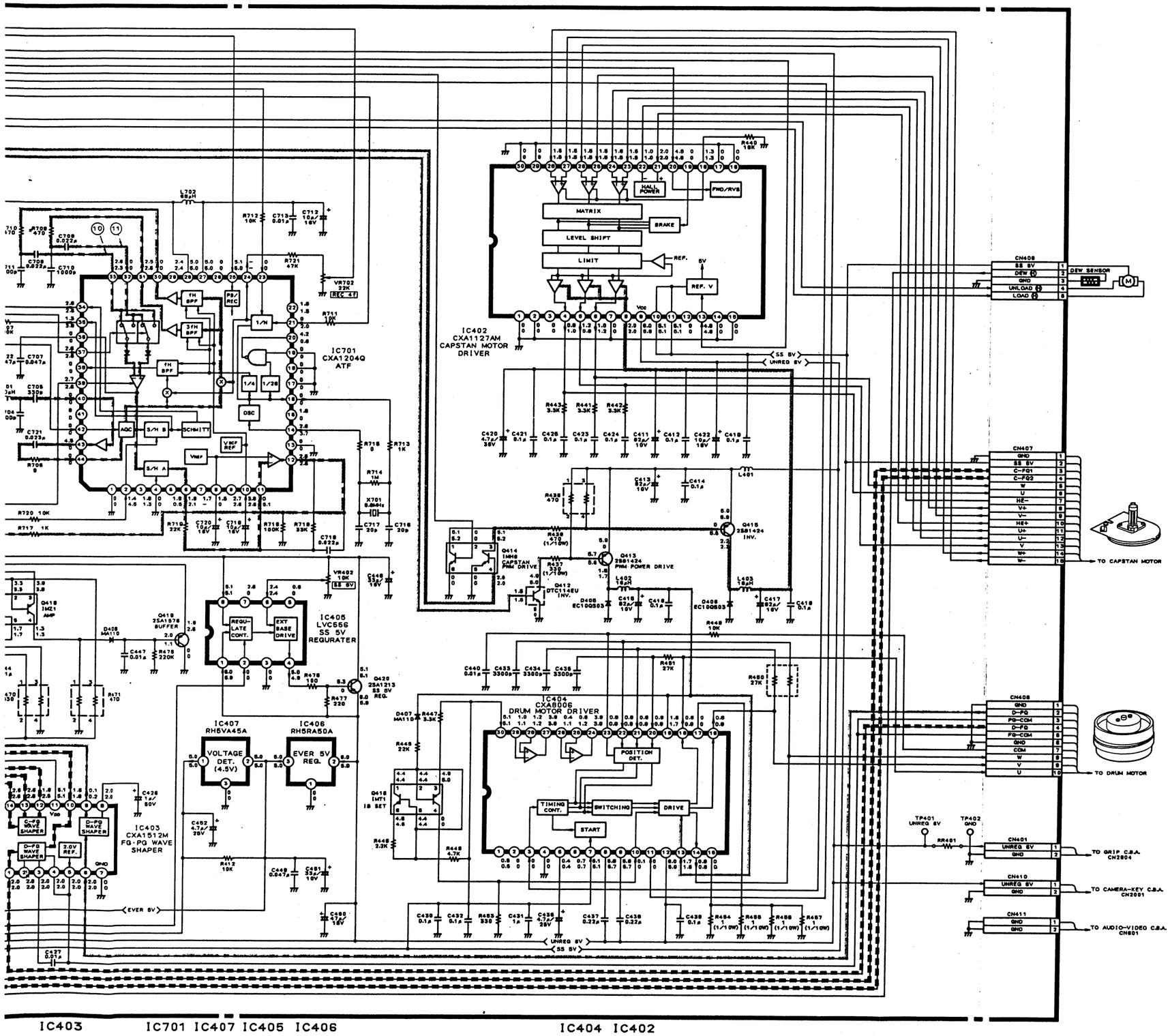
01 May. 1991

IC401

RVO SECTION)

○SIGNAL PATH
CAPSTAN PWM (BLUE)
CAPSTAN FG (BLUE)
CAPSTAN ATF (BLUE)
DRUM PWM (ORANGE)
DRUM FG (ORANGE)
DRUM PG (ORANGE)

IC401 IC403 IC701 IC407 IC405 IC406 IC404 IC4



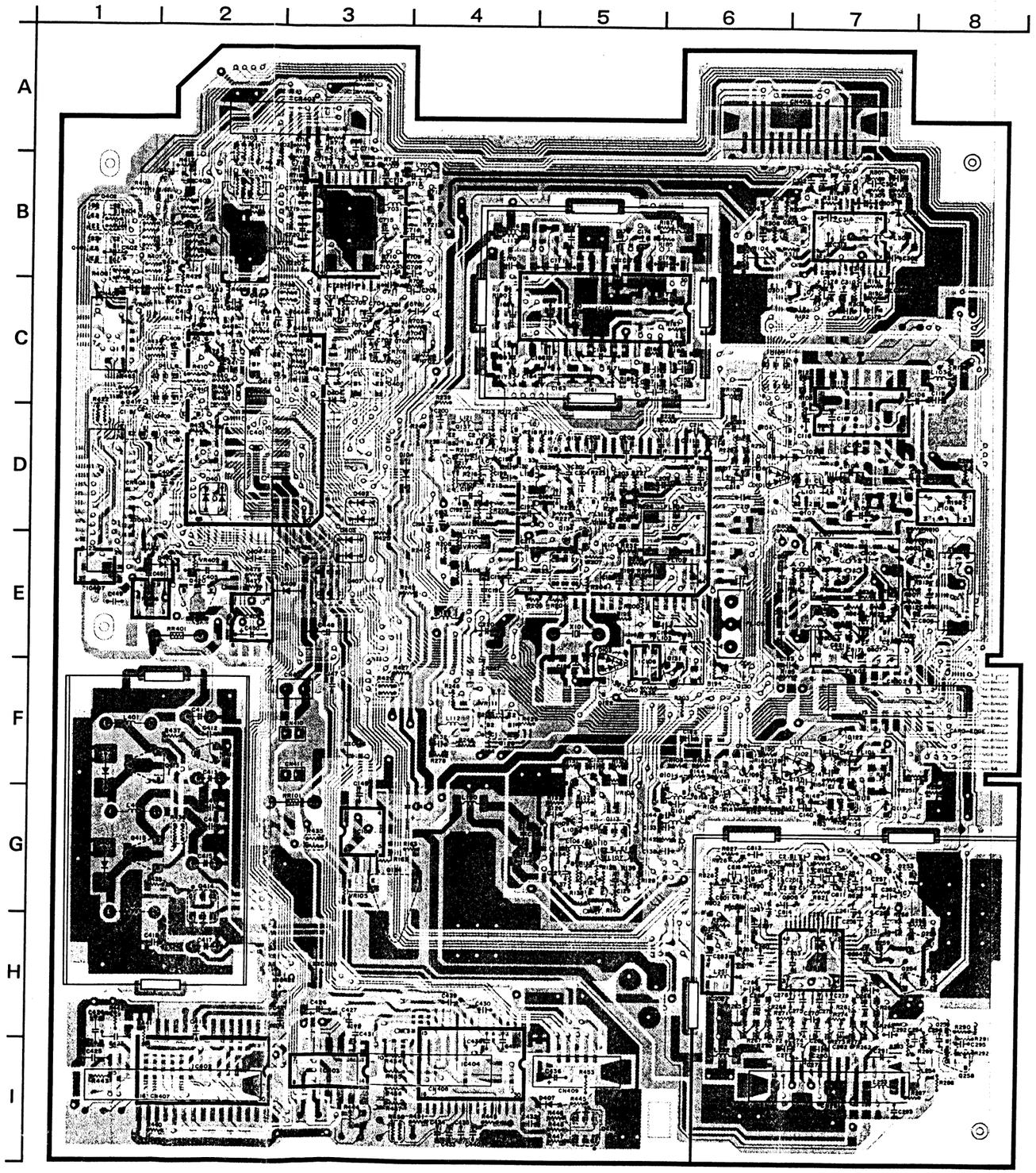
IC403 IC701 IC407 IC405 IC406 IC404 IC402

CIRCUIT BOARD DIAGRAM RECORDER-MAIN C.B.A.

RECORDER-MAIN C.B.A. (COMPONENT SIDE)

D101	D-7
D102	F-7
D103	F-5
D104	D-3
D108	D-7
D301	B-8
D401	D-2
D402	D-3
D403	E-3
D404	C-3
D405	F-1
D406	G-1
D407	I-5
D408	C-2
D409	E-3
D410	E-2
IC101	D-7
IC102	G-3
IC103	C-5
IC104	D-5
IC105	D-8
IC106	F-5
IC251	H-7
IC252	H-6
IC301	B-7
IC401	D-2
IC402	I-2
IC403	I-3
IC404	I-4
IC405	E-2
IC406	E-1
IC407	E-1
IC701	B-2
Q101	G-6
Q104	D-7
Q105	C-6
Q106	D-7
Q107	D-7
Q108	G-5
Q109	G-5
Q110	G-5
Q112	G-5
Q113	G-5
Q114	G-5
Q116	G-6
Q117	G-6
Q118	F-7
Q119	G-7
Q121	F-6
Q122	F-7
Q124	G-3
Q126	F-4
Q130	F-6
Q131	F-6
Q132	F-5

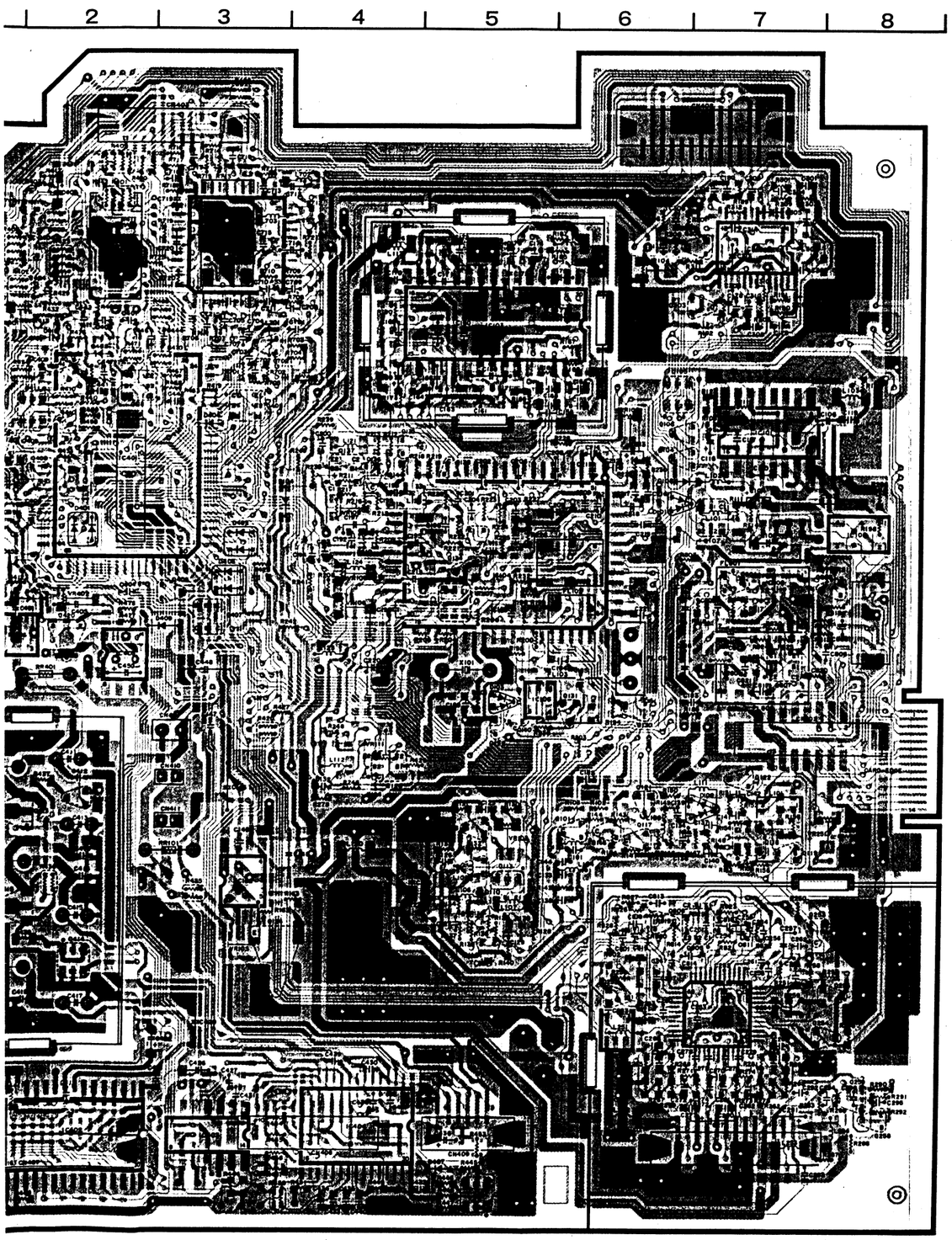
Q133	E-5
Q134	E-5
Q135	D-4
Q136	D-4
Q137	D-4
Q138	D-5
Q139	D-5
Q140	F-5
Q252	H-6
Q253	G-8
Q254	H-8
Q255	H-8
Q258	I-8
Q259	H-8
Q302	B-7
Q303	C-7
Q401	B-1
Q402	B-1
Q403	B-2
Q404	B-2
Q405	C-3
Q406	E-3
Q407	E-3
Q408	D-2
Q409	D-1
Q410	D-2
Q411	C-2
Q412	F-2
Q413	F-1
Q414	G-2
Q415	G-2
Q416	I-5
Q417	D-1
Q418	C-2
Q419	C-2
Q420	E-2
Q702	C-3
Q803	E-8
Q804	E-7
Q805	G-7
Q806	G-6
Q807	E-7
VR103	G-5
VR104	B-7
VR105	G-3
VR106	E-4
VR107	E-4
VR108	D-4
VR109	C-6
VR111	F-4
VR251	F-8
VR401	C-1
VR402	E-2
VR702	C-4
VR801	E-7



RECORDE (SOLDER

D101	D-
D102	F-
D103	F-
D104	D-
D108	D-
D301	B-
D401	D-
D402	D-
D403	E-
D404	C-
D405	F-
D406	G-
D407	I-
D408	C-
D409	E-
D410	E-
IC101	D-
IC102	G-
IC103	C-
IC104	E-
IC105	D-
IC106	F-
IC251	H-
IC252	H-
IC301	B-
IC401	D-
IC402	I-
IC403	I-
IC404	I-
IC405	E-
IC406	E-
IC407	E-
IC701	B-
Q101	G-
Q104	D-
Q105	C-
Q106	D-
Q107	D-
Q108	G-
Q109	G-
Q110	G-
Q112	G-
Q113	G-
Q114	G-
Q116	G-
Q117	G-
Q118	F-
Q119	G-
Q121	F-
Q122	F-
Q124	G-
Q126	F-
Q130	F-
Q131	F-
Q132	F-

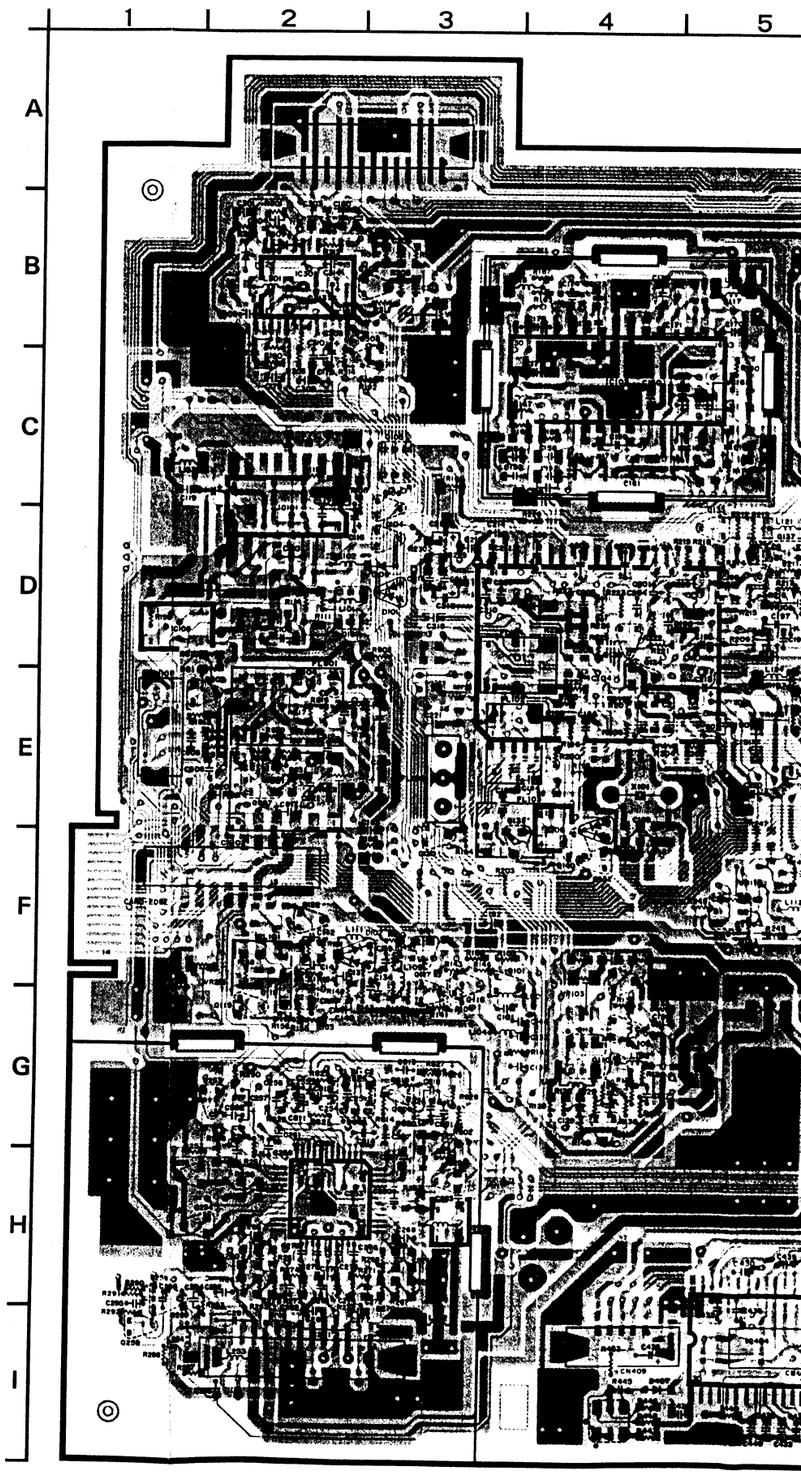
DER-MAIN C.B.A.

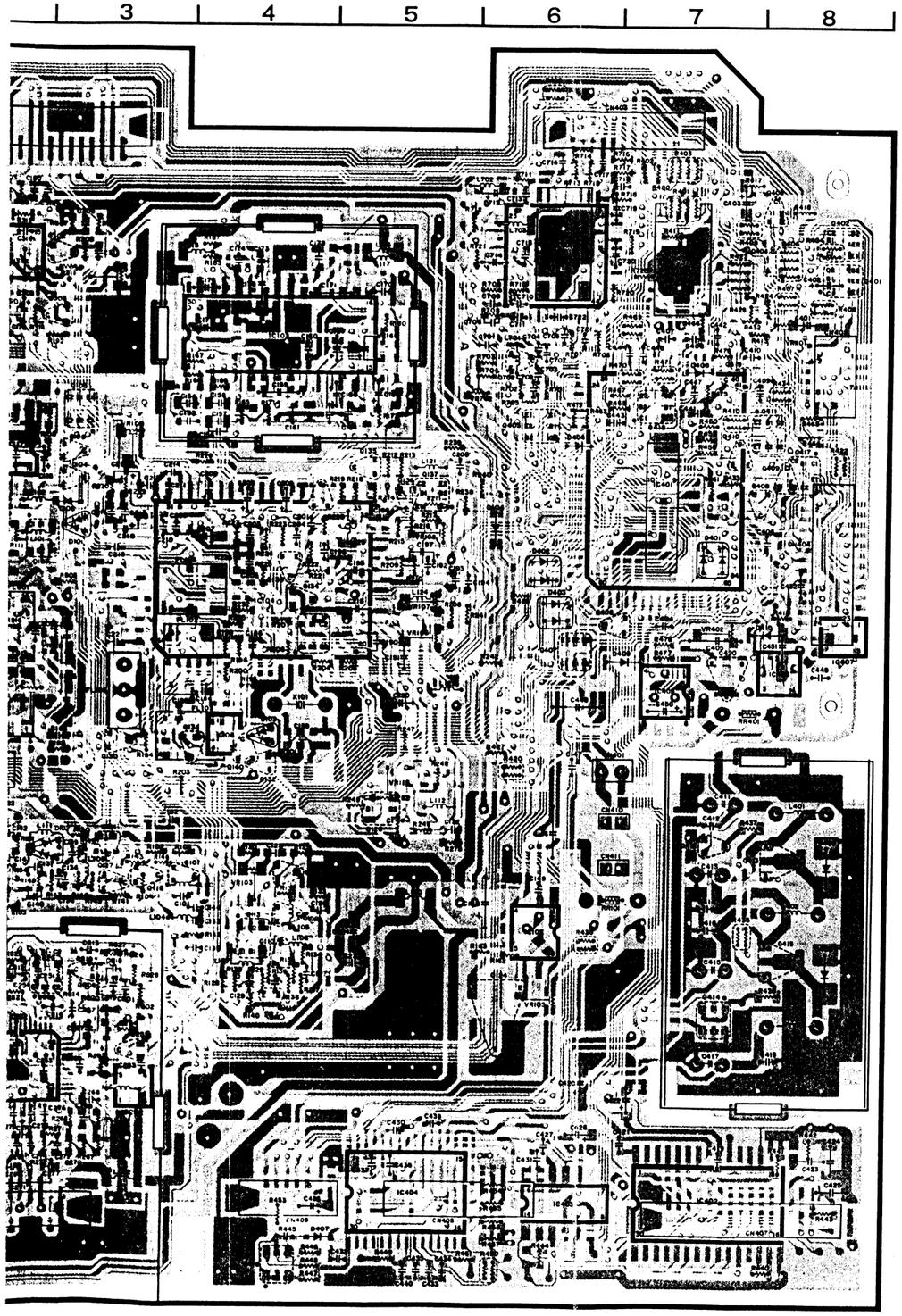


RECORDER-MAIN C.B.A. (SOLDERING SIDE)

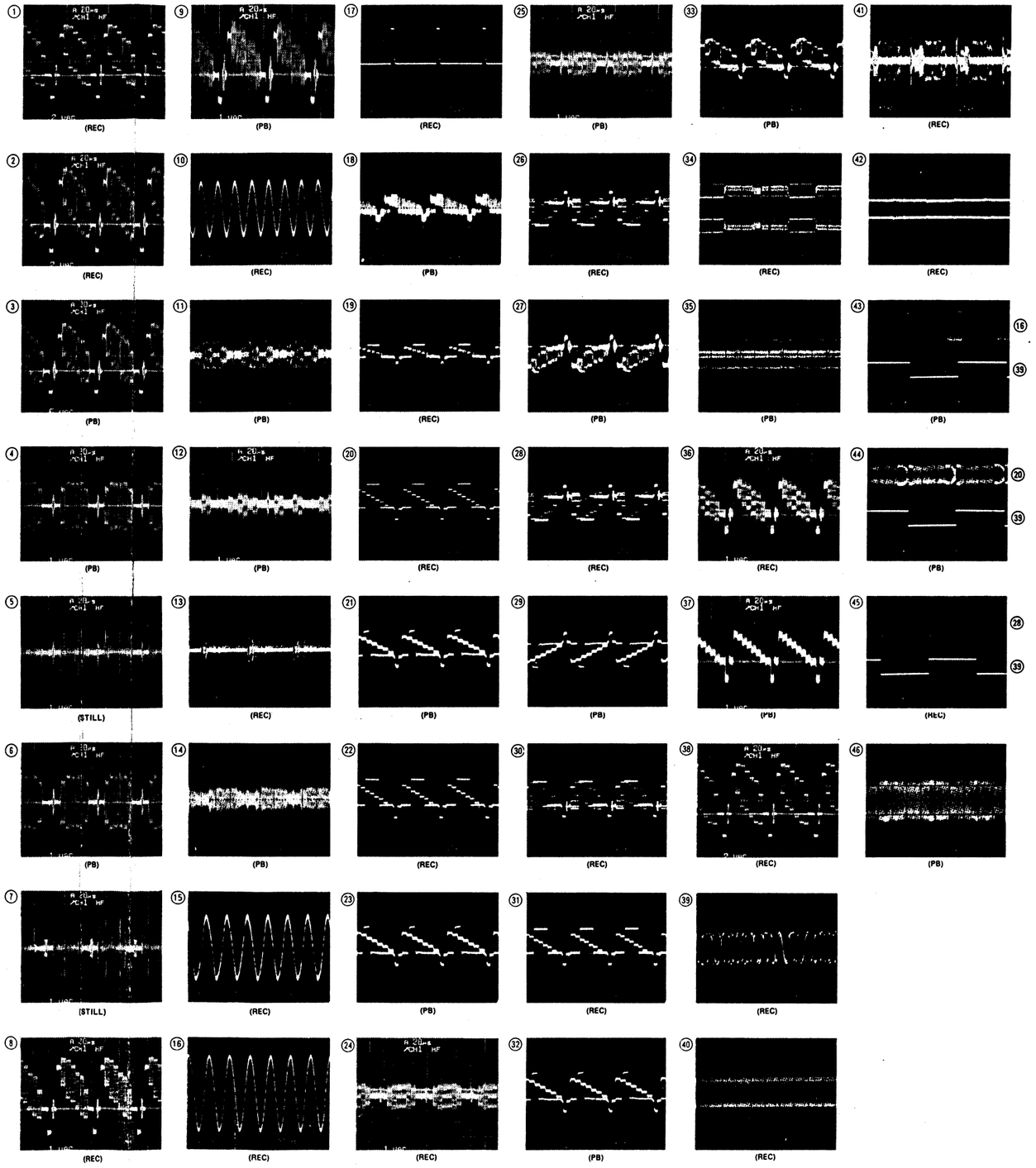
D101	D-3
D102	F-3
D103	F-4
D104	D-6
D108	D-3
D301	B-2
D401	D-7
D402	D-6
D403	E-6
D404	C-6
D405	F-8
D406	G-8
D407	I-5
D408	C-7
D409	E-7
D410	E-8
IC101	D-2
IC102	G-6
IC103	C-4
IC104	E-4
IC105	D-1
IC106	F-4
IC251	H-2
IC252	H-3
IC301	B-2
IC401	D-7
IC402	I-7
IC403	I-6
IC404	I-5
IC405	E-7
IC406	E-8
IC407	E-8
IC701	B-6
Q101	G-4
Q104	D-3
Q105	C-3
Q106	D-3
Q107	D-2
Q108	G-4
Q109	G-4
Q110	G-4
Q112	G-4
Q113	G-4
Q114	G-4
Q116	G-3
Q117	G-3
Q118	F-2
Q119	G-2
Q121	F-3
Q122	F-2
Q124	G-6
Q126	F-5
Q130	F-3
Q131	F-4
Q132	F-4

Q133	E-4
Q134	E-4
Q135	D-5
Q136	D-5
Q137	D-5
Q138	D-4
Q139	D-4
Q140	F-4
Q252	H-3
Q253	G-2
Q254	H-2
Q255	H-1
Q258	I-1
Q259	I-9
Q302	B-3
Q303	C-3
Q401	B-8
Q402	B-8
Q403	B-8
Q404	B-8
Q405	C-6
Q406	E-7
Q407	E-6
Q408	D-8
Q409	D-8
Q410	D-7
Q411	C-8
Q412	F-7
Q413	F-8
Q414	G-7
Q415	G-7
Q416	I-4
Q417	D-8
Q418	C-7
Q419	C-7
Q420	E-7
Q702	C-6
Q803	E-1
Q804	E-2
Q805	G-3
Q806	G-3
Q807	E-2
VR103	G-4
VR104	B-3
VR105	G-6
VR106	E-5
VR107	E-5
VR108	D-5
VR109	C-3
VR111	F-5
VR251	F-2
VR401	B-8
VR402	E-7
VR702	C-6
VR801	E-2





SIGNAL WAVEFORMS



SCHEMATIC DIAGRAM RECORDER-MAIN C.B.A. (VIDEO SECTION)

○SIGNAL PATH — REC Y+C SIGNAL (GRAY) / PB Y+C SIGNAL (GRAY) — REC Y SIGNAL (BLUE) / PB Y SIGNAL (BLUE) — REC C SIGNAL (ORANGE) / PB C SIGNAL (ORANGE) — REC A SIGNAL (RED) / PB A SIGNAL (RED)

RECORDER-
MAIN C.B.A.
VIDEO SECTION

CN102
1 A-FADE
2 SC
3 LENS SW
4 NC
5 HEAD SW PULSE
6 NC
7 PB-RF (AUDIO)
8 VIDEO (AV OUT)
9 REC APM
10 VIDEO (AV IN)
11 GND
12 VIDEO I/O
13 AV 5V
14 GND
TO AUDIO-VIDEO C.B.A. CN602

CN101
1 CAMERA VIDEO
2 GND
3 A-FADE
4 LENS SW
TO CAMERA-MAIN C.B.A. CN1301

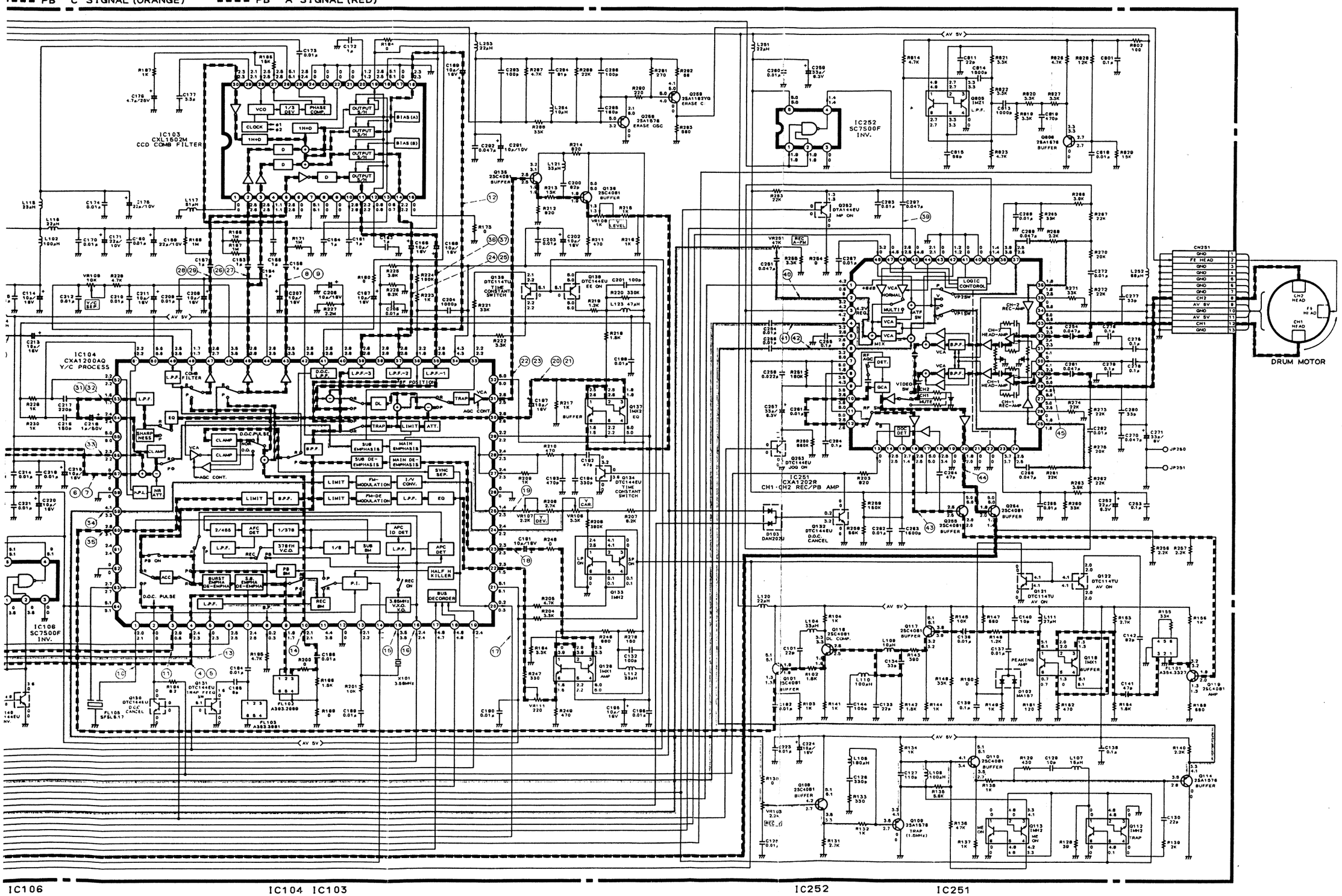
UNREG 8V
EVF VIDEO
PB-RF DET
AV 5V
CG BLK
CG (VIDEO)
NC
FE ON
JOG VD
JOG Ø
VIDEO-CS
AV ON
PB Ø /EE
SW PULSE 1
SW PULSE 2
C-SYNC
HEAD SW PULSE
NC
S-DATA
CLOCK 2
ME Ø AMP
RF-PB Ø
SS ON
AV 5V
PB-RF
CH KEY
CH MODE 1
CH MODE 2
REC ATF
TRACK SHIFT
PB-RF (ATF)
TO RECORDER-MAIN C.B.A. SYSCON-SERVO SECTION

IC301 CXA1203N SEQ.COMP.
IC102 LVC656 AV 5V REGURATER
IC101 MM1002 INPUT
IC105 MM1031M AMP.
IC106 SC7500F INV.
IC103 CXL1502M CCD COMB FILTER
IC104 CXA1200AQ Y/C PROCESS

IC102 IC301 IC101 IC105 IC106 IC104 IC103

01 May. 1991

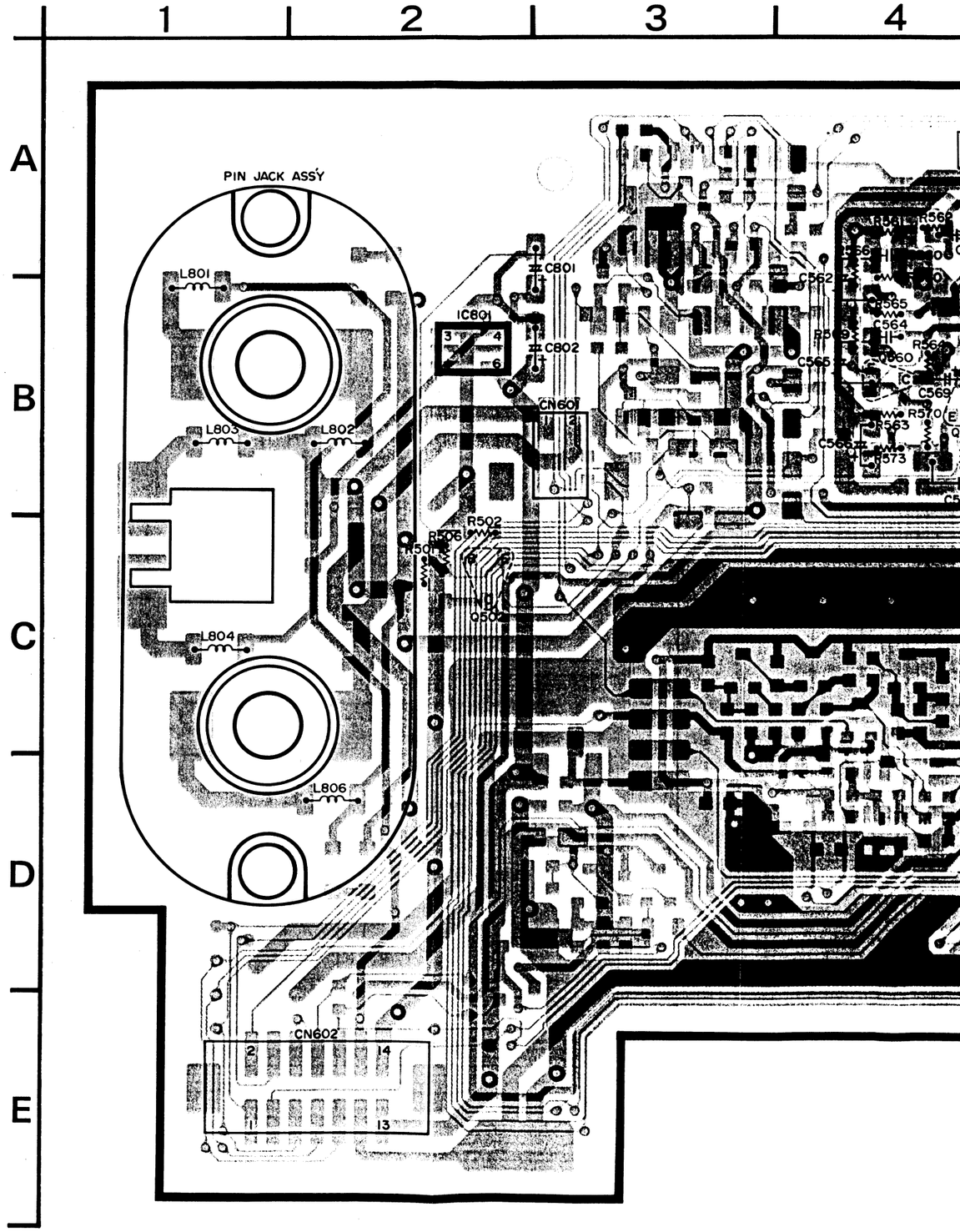
REC C SIGNAL (ORANGE)
PB C SIGNAL (ORANGE)
REC A SIGNAL (RED)
PB A SIGNAL (RED)
PB (CAPSTAN) ATF (BLUE)



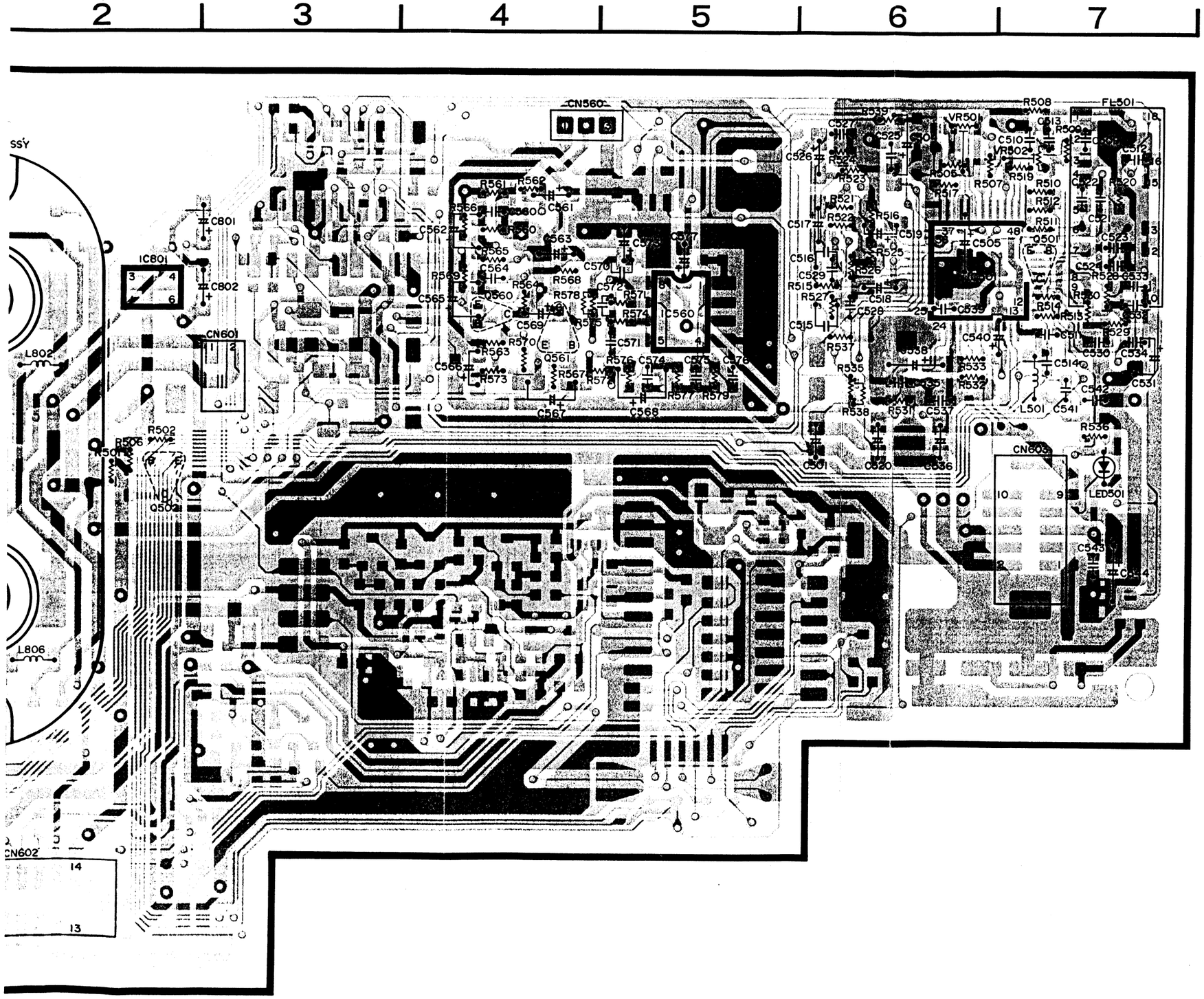
CIRCUIT BOARD DIAGRAM AUDIO-VIDEO C.B.A.

AUDIO–VIDEO C.B.A.

IC501	B–6
IC560	B–5
IC801	B–2
Q501	B–7
Q502	C–2
Q560	B–4
Q561	B–4
VR501	A–6
VR502	A–7

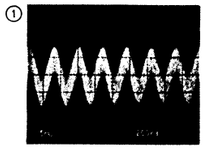


O-VIDEO C.B.A.

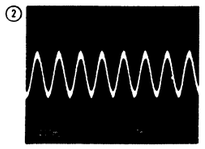


SIGNAL WAVEFORMS

① (PB)



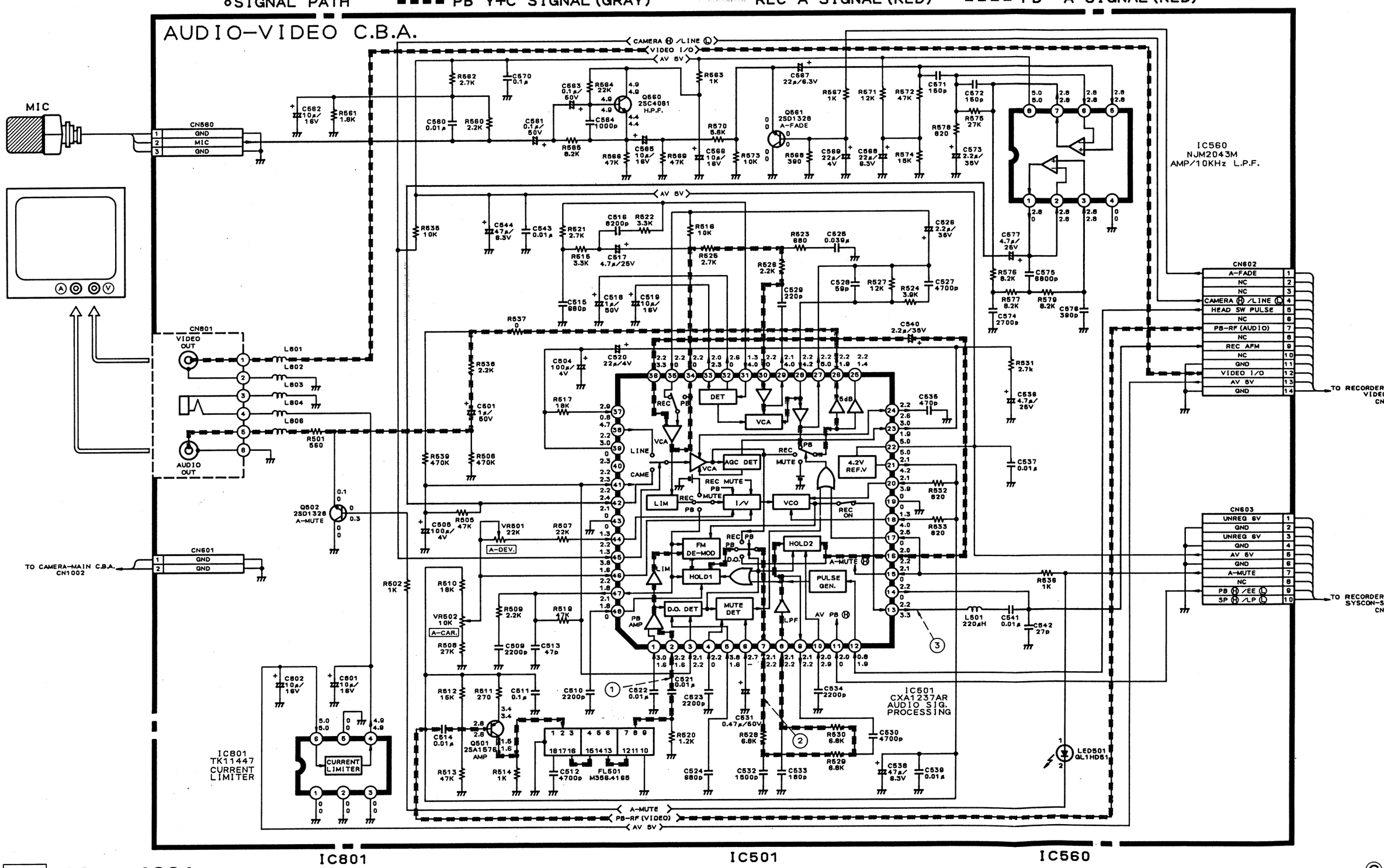
② (PB)



③ (REC)

SCHEMATIC DIAGRAM AUDIO-VIDEO C.B.A.

o SIGNAL PATH ▬▬ PB Y+C SIGNAL (GRAY) ▬▬ REC A SIGNAL (RED) ▬▬ PB A SIGNAL (RED)

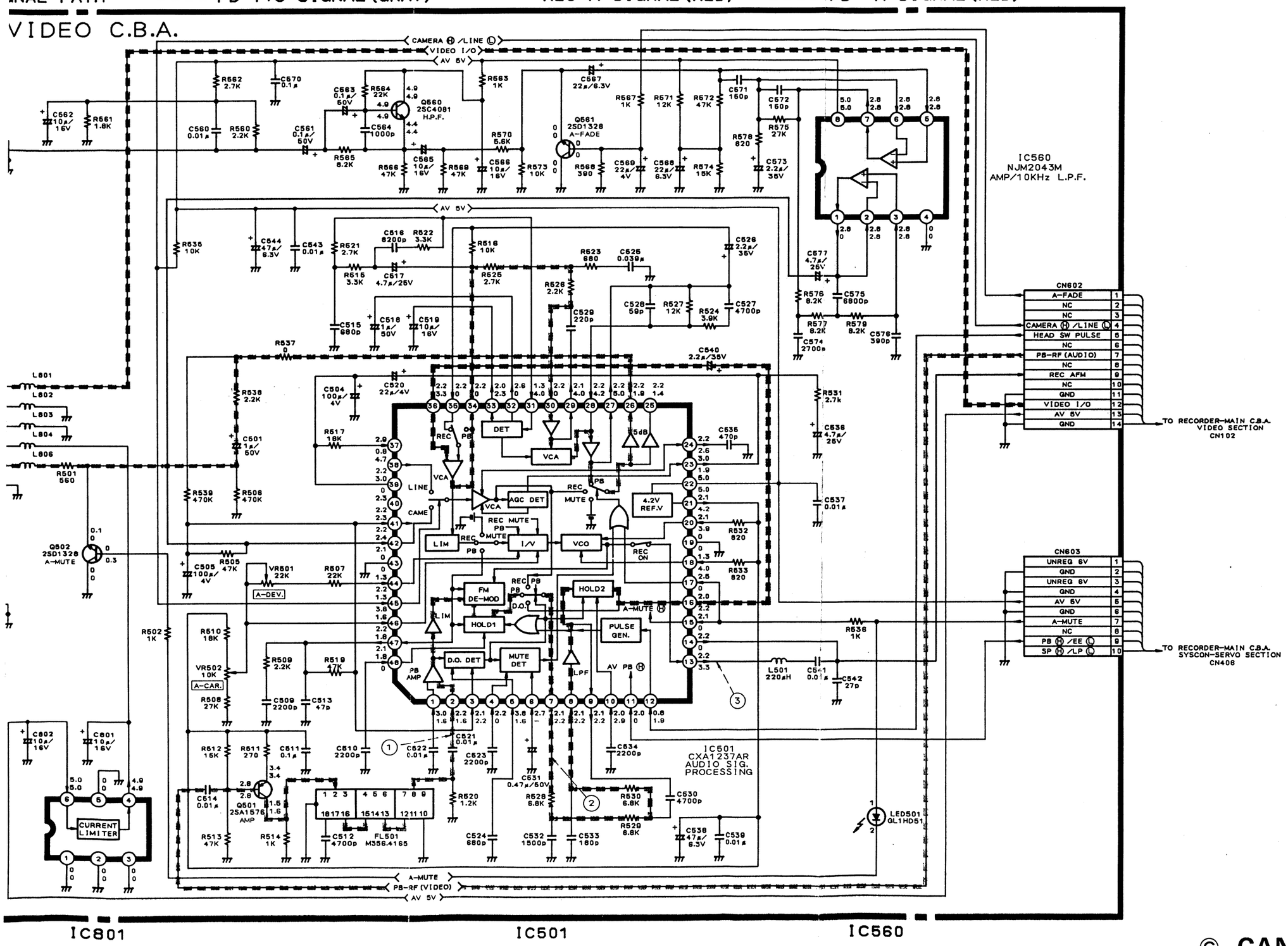


01 May. 1991

M AUDIO-VIDEO C.B.A.

NAL PATH ▬▬▬ PB Y+C SIGNAL (GRAY) ▬▬▬ REC A SIGNAL (RED) ▬▬▬ PB A SIGNAL (RED)

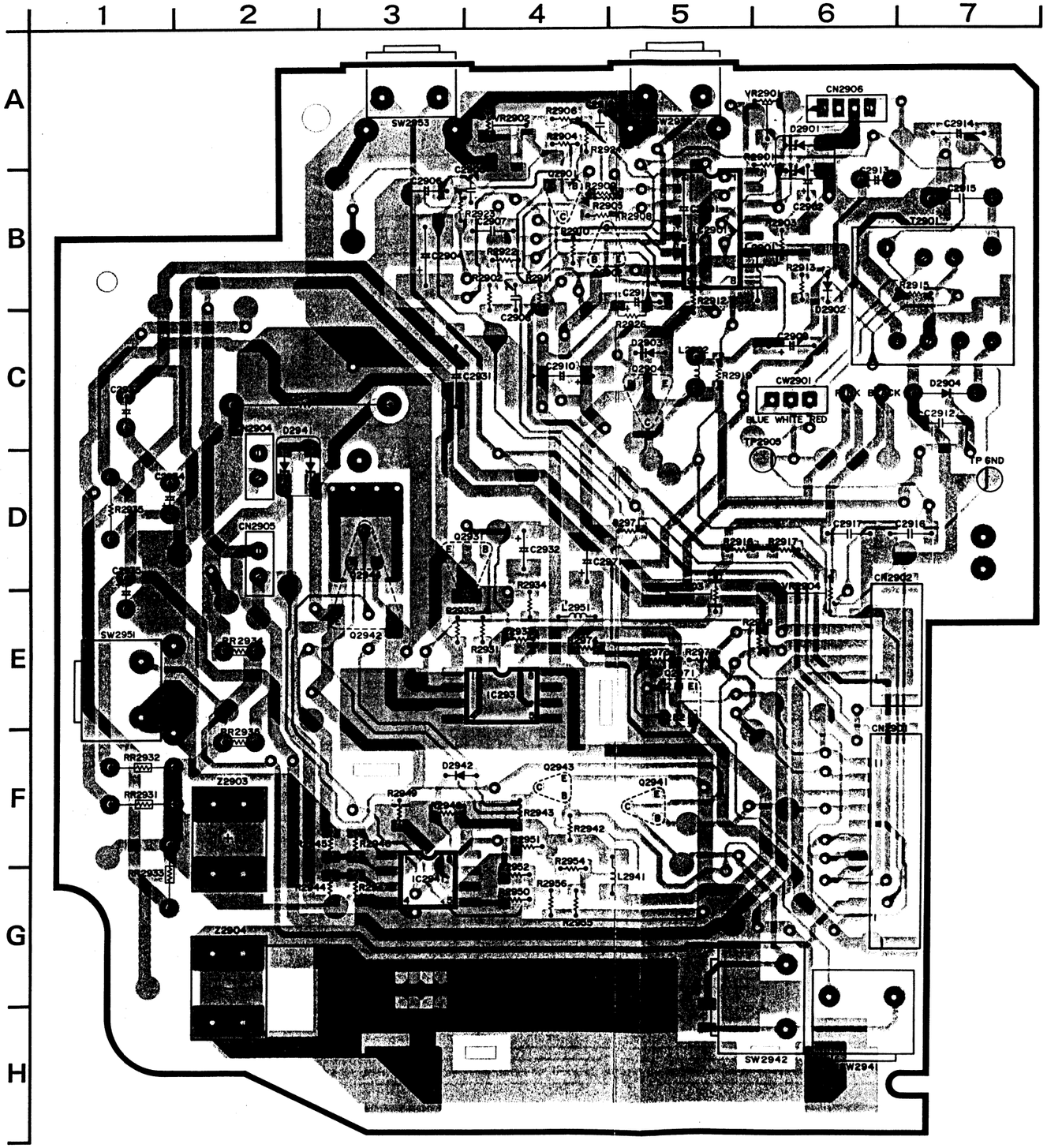
VIDEO C.B.A.



CIRCUIT BOARD DIAGRAM GRIP C.B.A.

GRIP C.B.A.

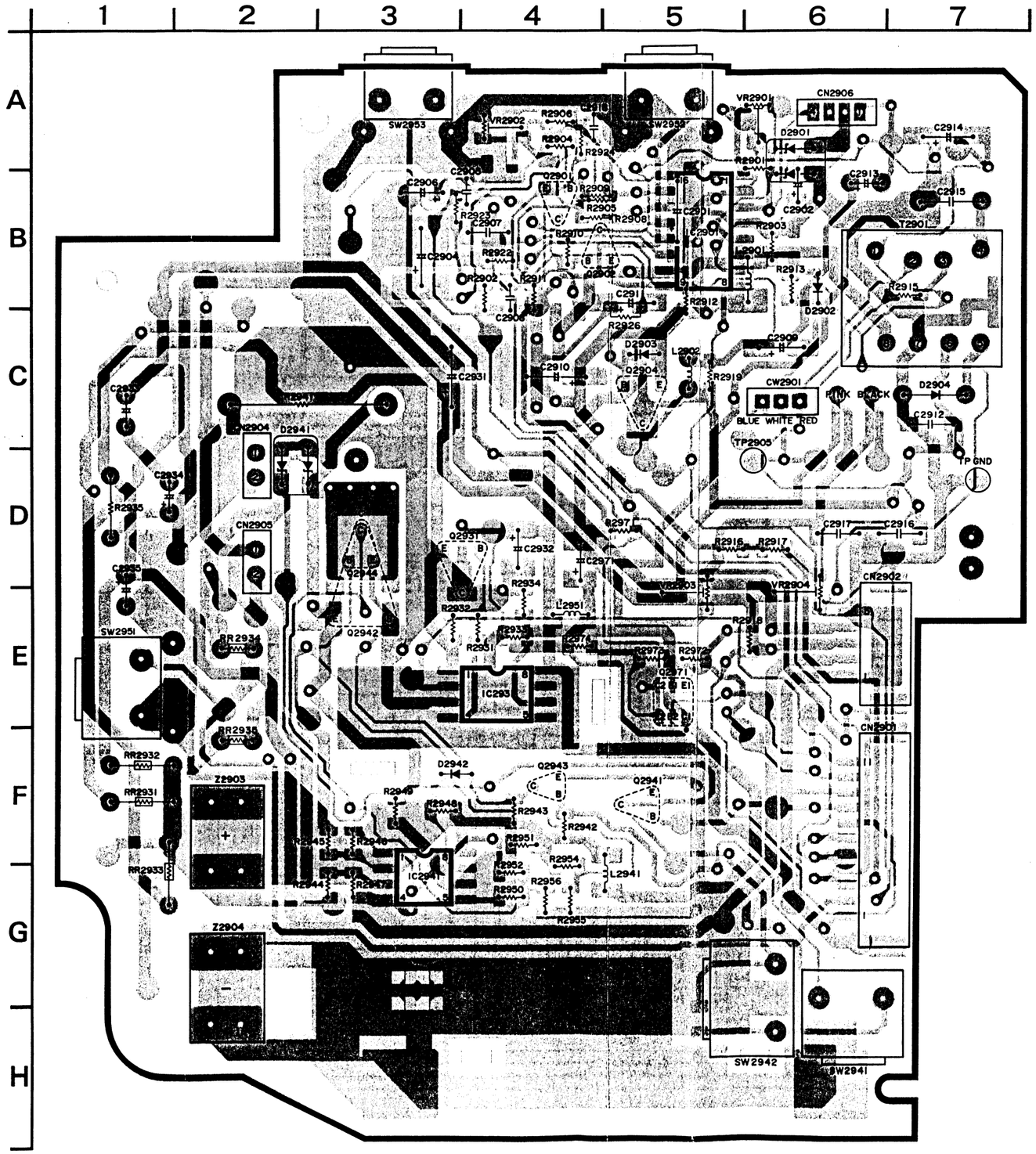
D2901	A-6
D2902	B-6
D2903	C-5
D2904	C-7
D2941	D-2
D2942	F-3
IC2901	B-5
IC2931	E-4
IC2941	F-3
Q2901	B-4
Q2902	B-4
Q2904	C-5
Q2931	D-4
Q2941	F-5
Q2942	E-3
Q2943	F-4
Q2944	D-3
Q2971	E-5
VR2901	A-6
VR2903	E-5
VR2904	E-6
VR2902	A-4



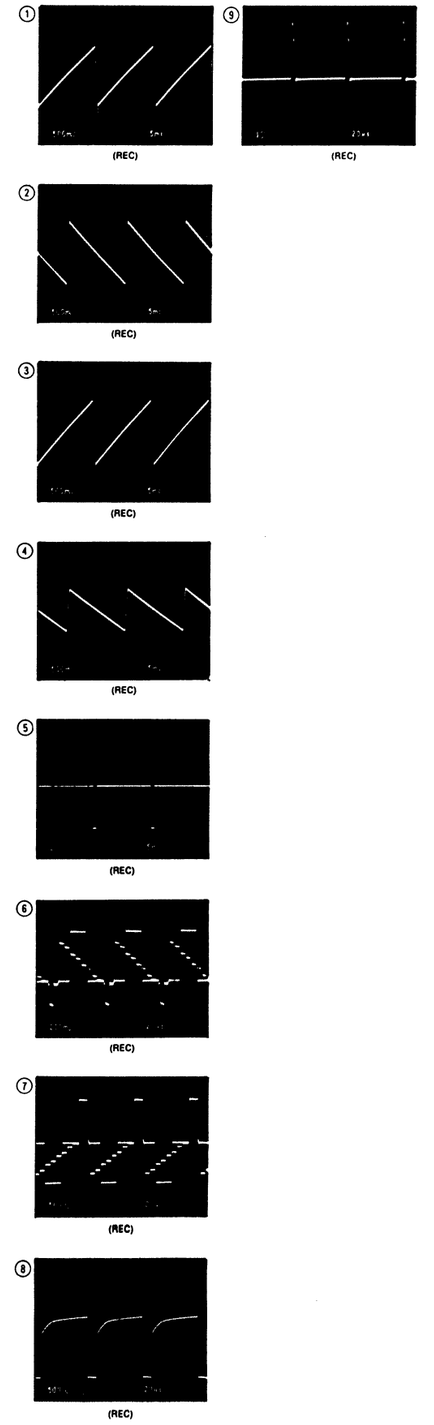
CIRCUIT BOARD DIAGRAM GRIP C.B.A.

GRIP C.B.A.

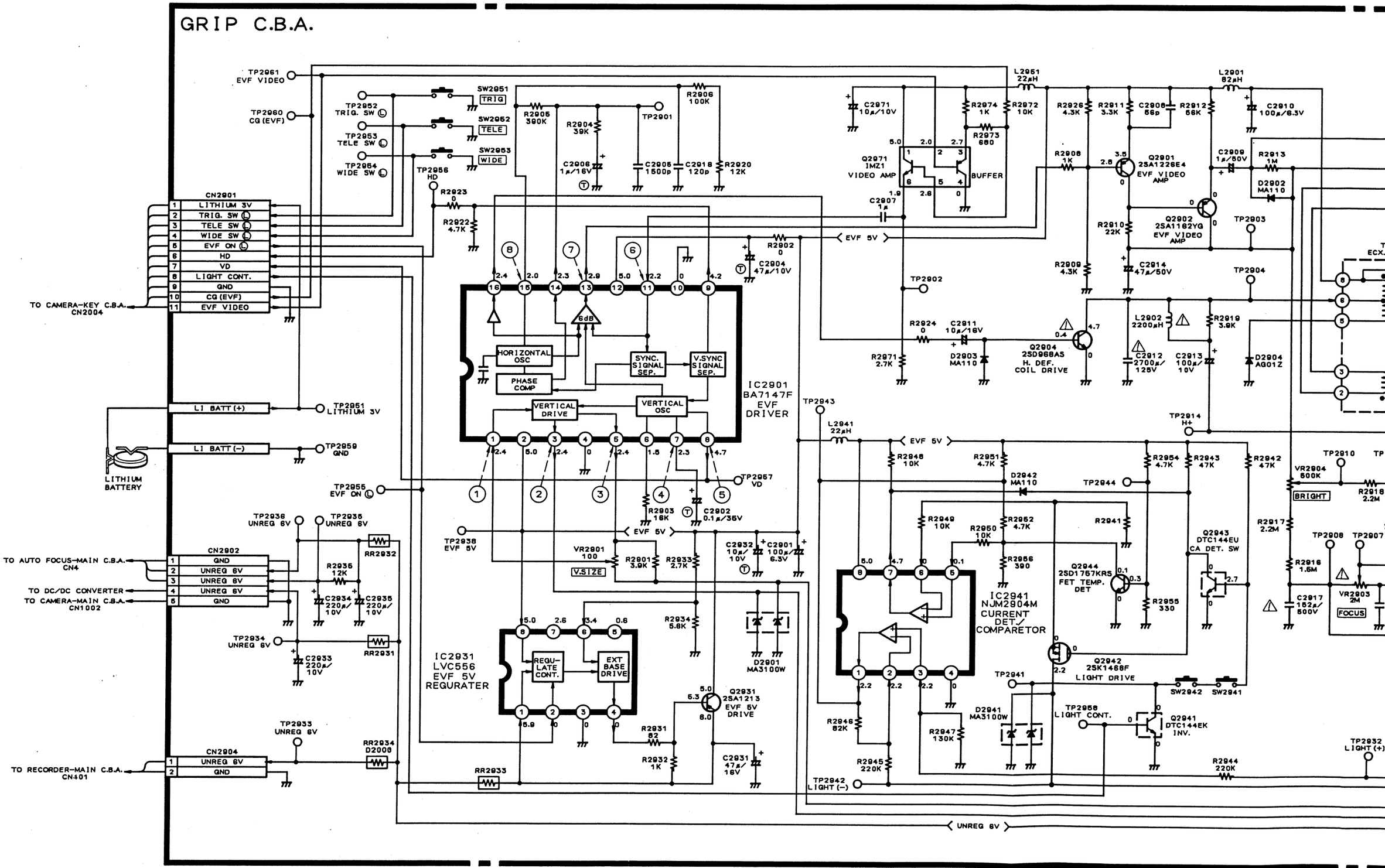
D2901	A-6
D2902	B-6
D2903	C-5
D2904	C-7
D2941	D-2
D2942	F-3
IC2901	B-5
IC2931	E-4
IC2941	F-3
Q2901	B-4
Q2902	B-4
Q2904	C-5
Q2931	D-4
Q2941	F-5
Q2942	E-3
Q2943	F-4
Q2944	D-3
Q2971	E-5
VR2901	A-6
VR2903	E-5
VR2904	E-6
VR2902	A-4



SIGNAL WAVEFORMS

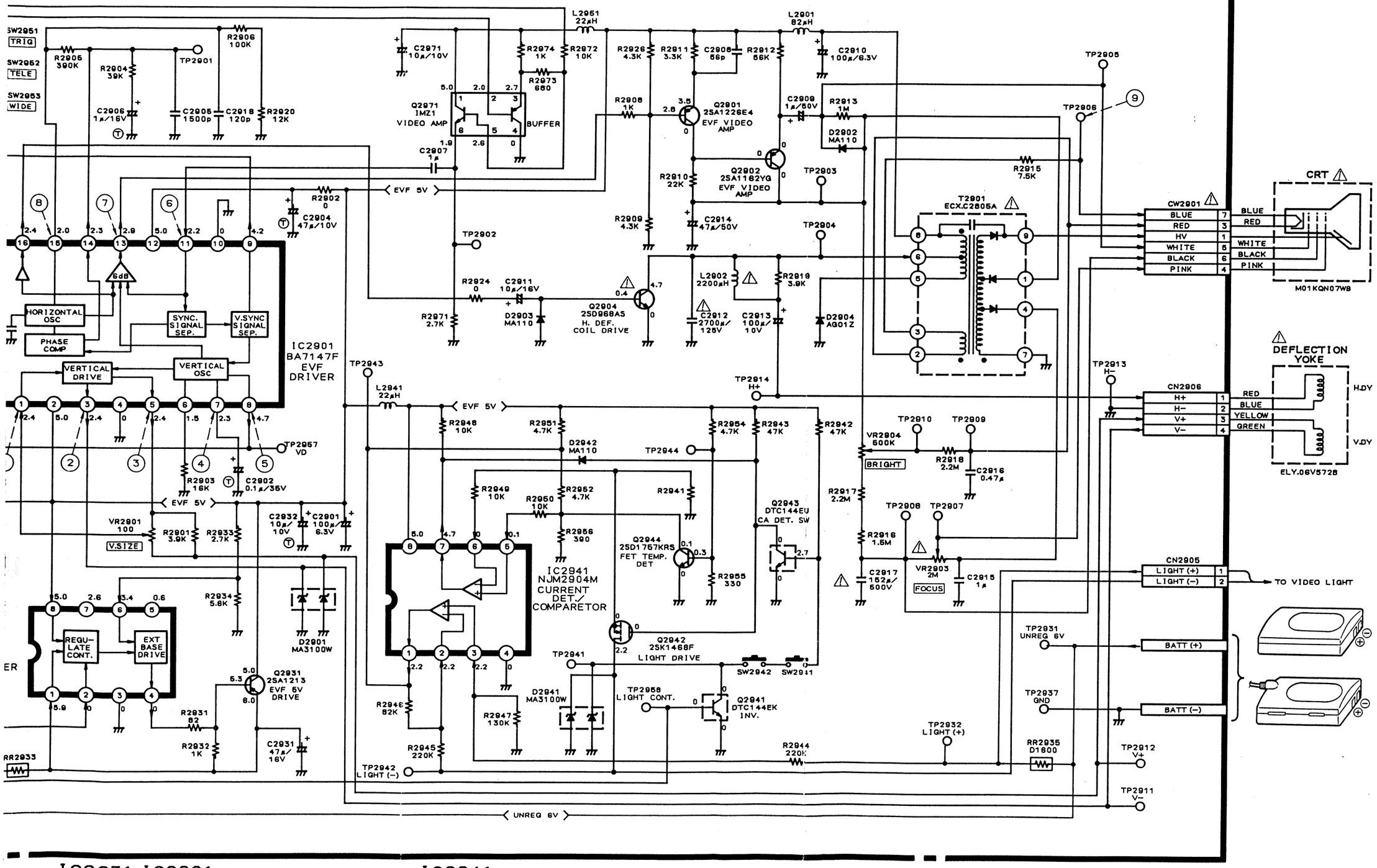


SCHEMATIC DIAGRAM GRIP C.B.A.



IC2931 IC2901 IC2941

01 May. 1991



IC2931 IC2901 IC2941

Canovision 8

SERVICE MANUAL

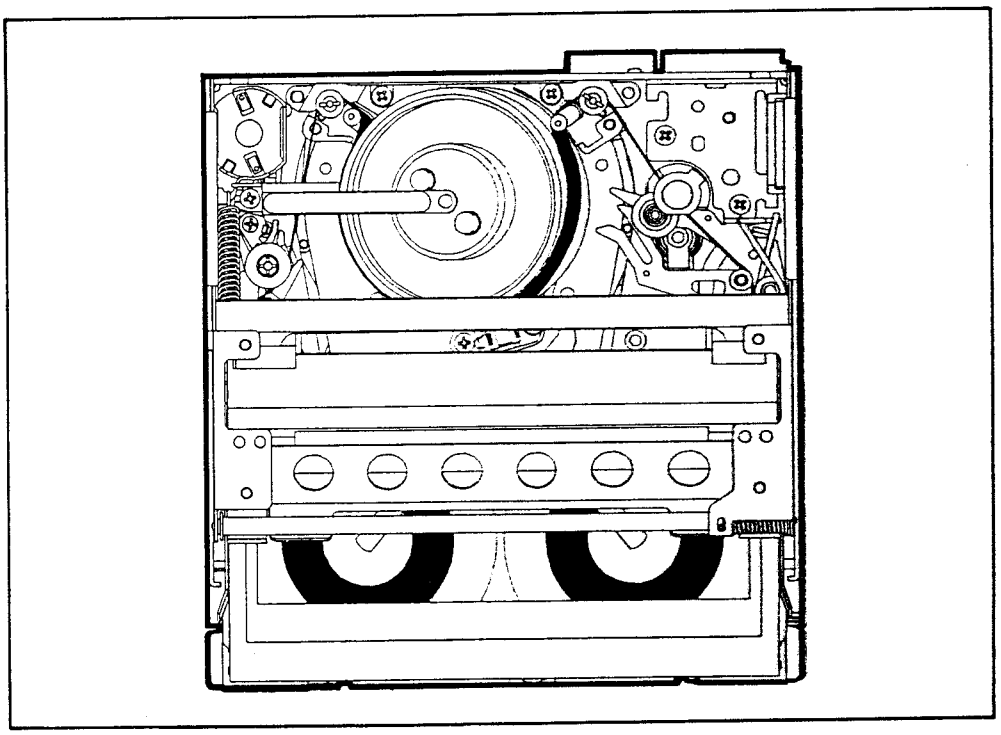
MC-4B

NTSC

PAL

SECAM

MECHANICAL CHASSIS



DY8-3391-501-201

Canon Inc.
Video Technical Service Dept.
First Edition: Dec. 1988
Printed in Japan

Table of Contents

Chapter 1 Operations

1.Main Parts in Mechanical Section

1-1 Locations and Nomenclatures

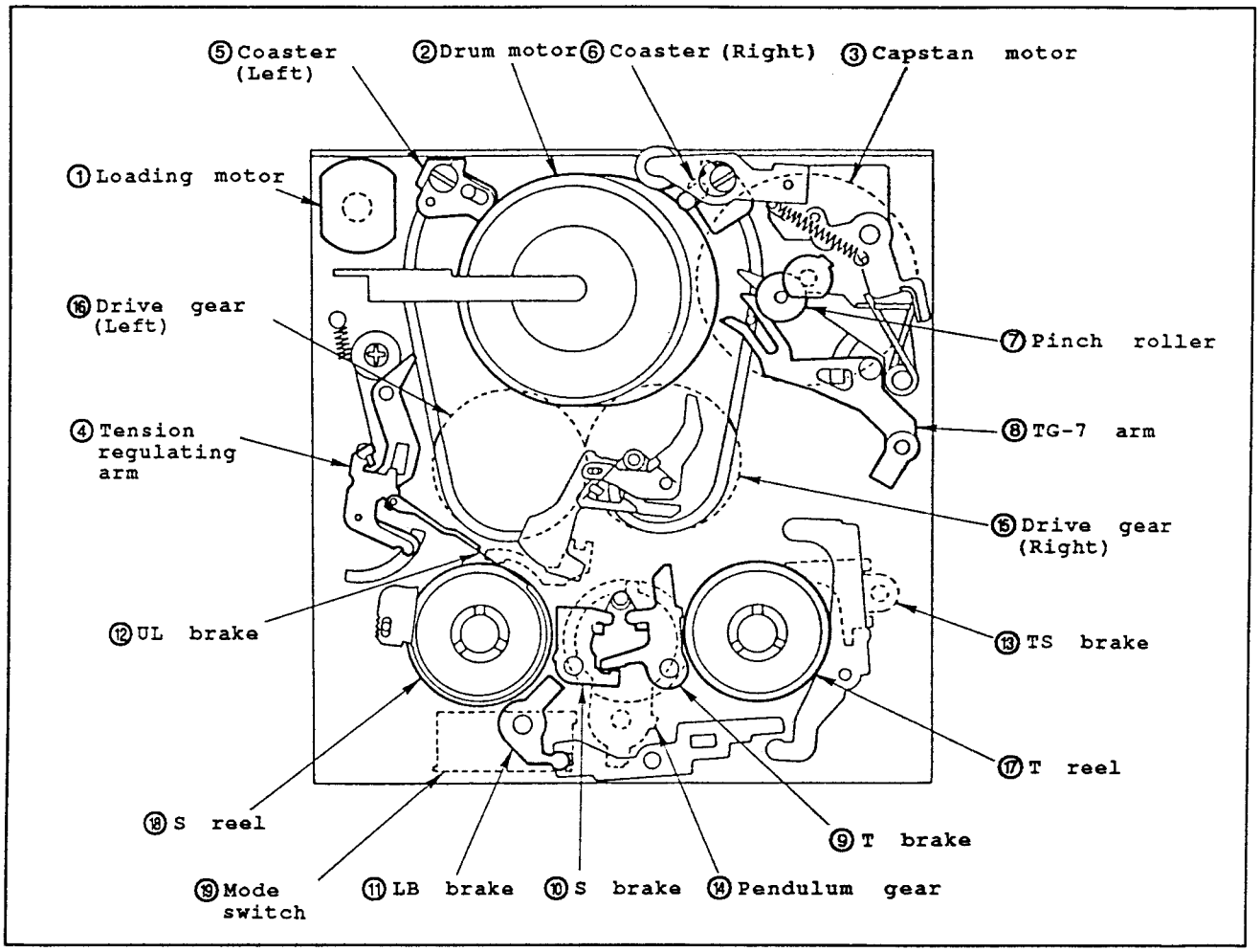


Fig.I-1

1-2 Relationships between Each Mode and Mode Switch

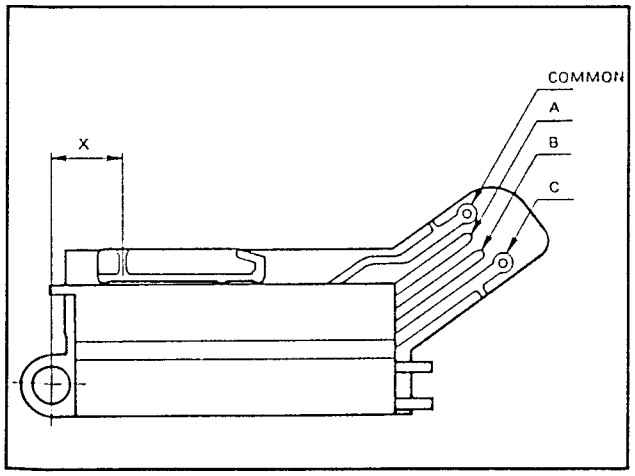


Fig.I-2

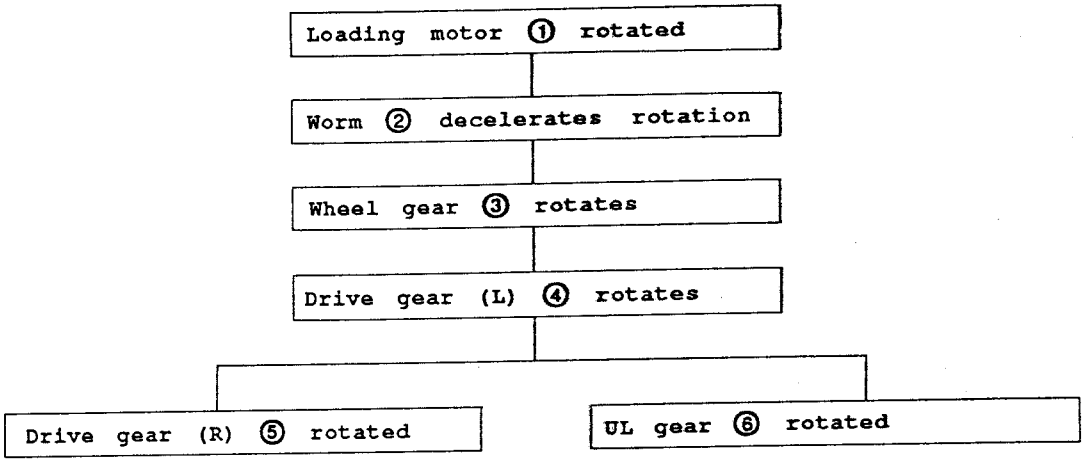
Modes	X (mm)	A	B	C
Eject	1.7-2.7	opened	opened	shorted
Blank	2.7-5.7	opened	opened	opened
Load/Unload	5.7-6.7	opened	shorted	shorted
Blank	6.7-8.1	opened	shorted	opened
Stop	8.1-9.1	shorted	shorted	opened
Blank	9.1-12.0	shorted	opened	opened
Play	12.0-13.3	shorted	opened	shorted

Table I-1

Note: "Opened" and "Shorted" in the table is versus the COMMON.

2.Operation in Each Section

2-1 Gear Train



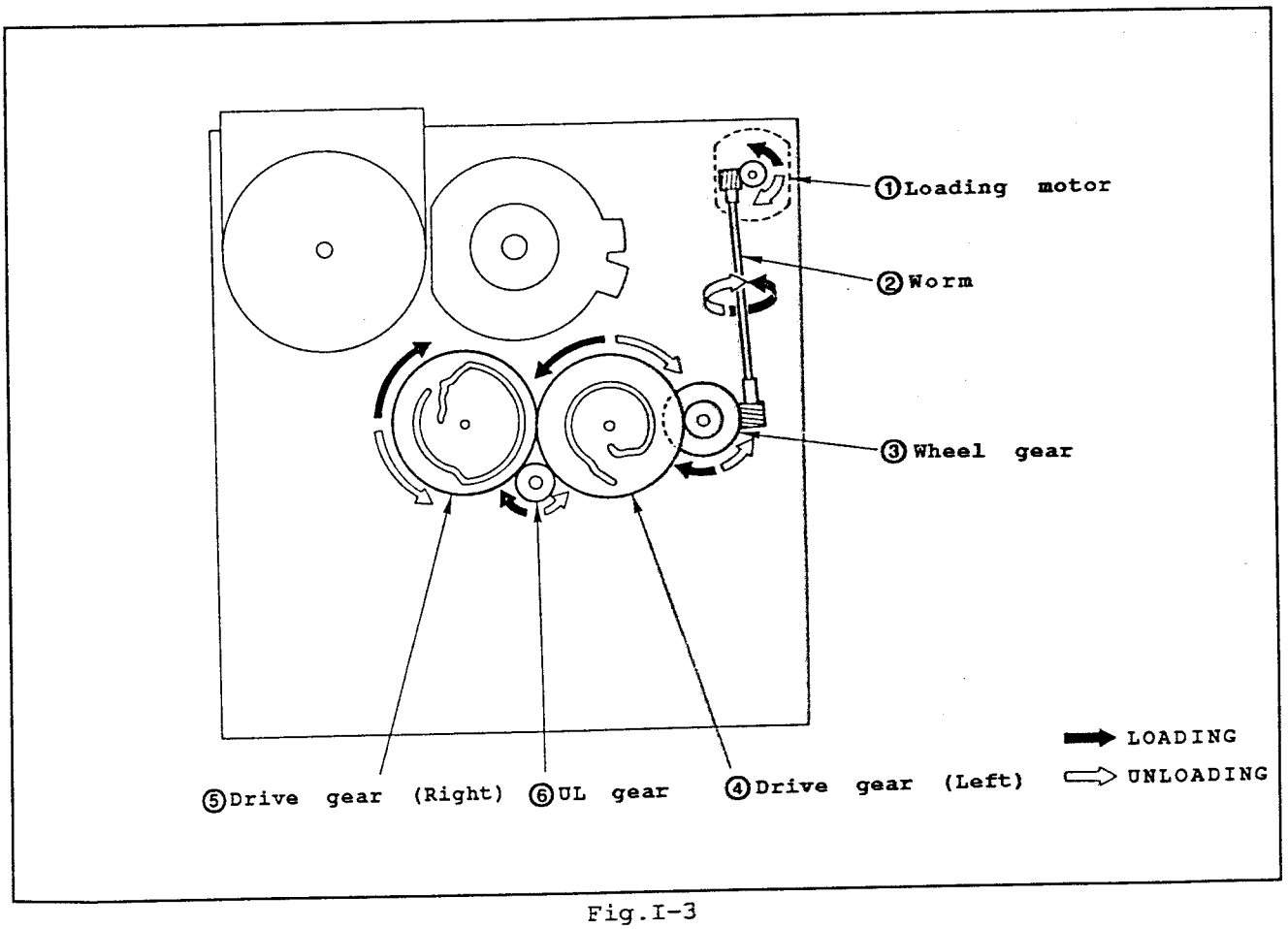
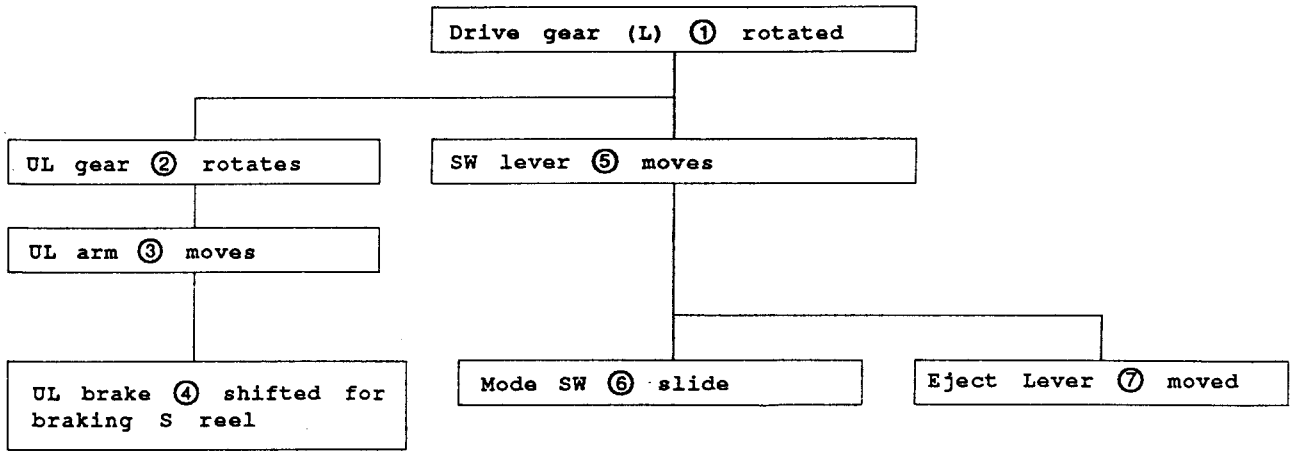


Fig.I-3

2-2 Mode SW, Eject Lever, UL Brake



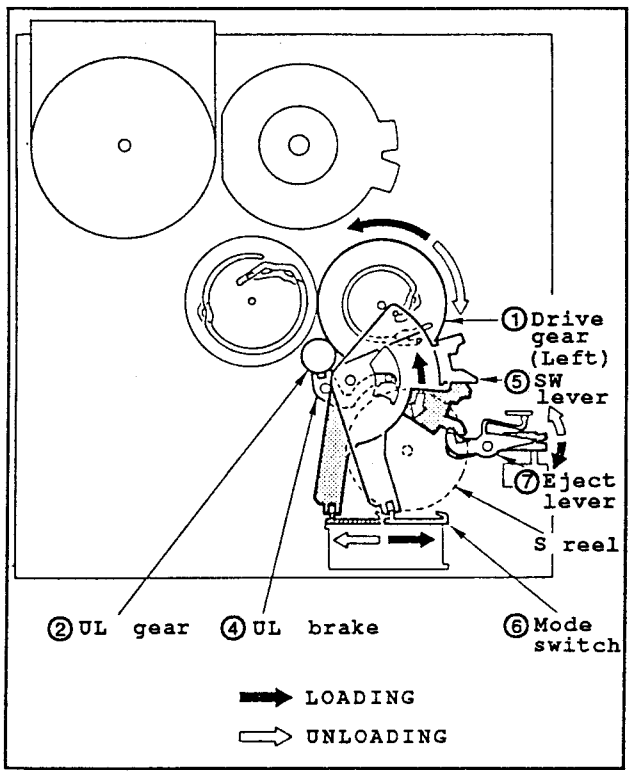


Fig.I-4

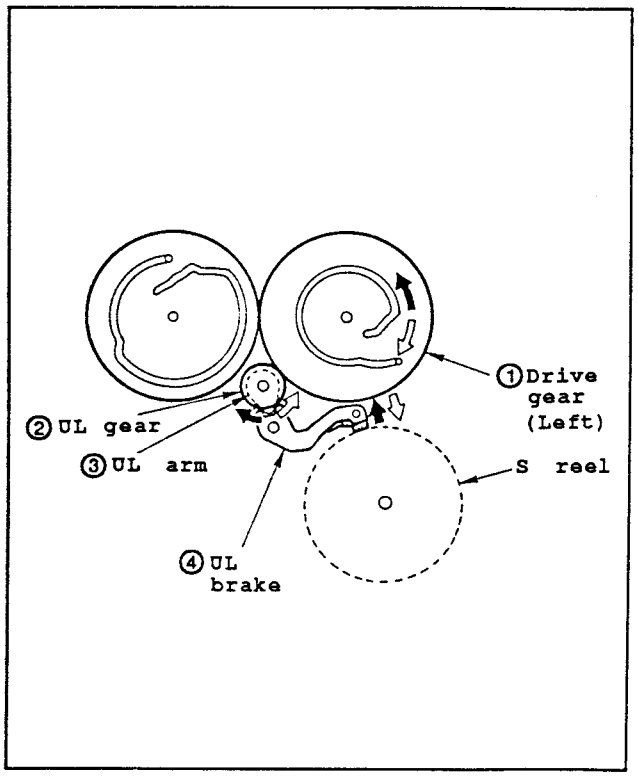
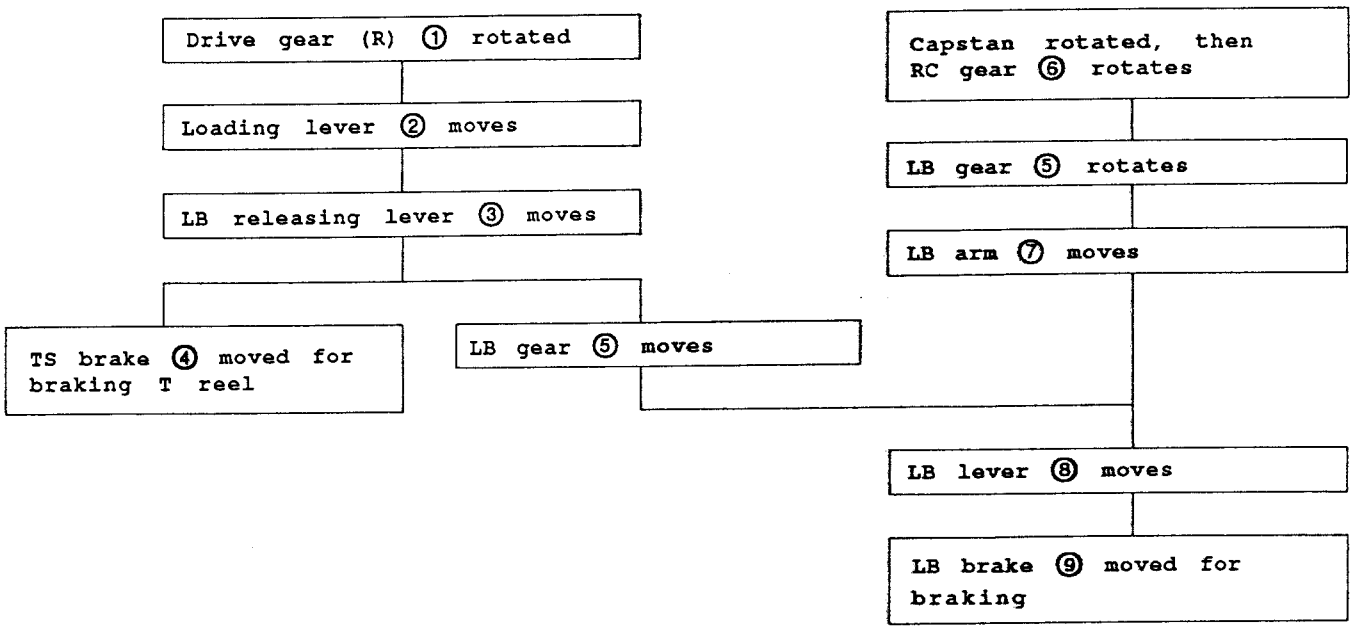


Fig.I-5

2-3 TS Brake, LB Brake



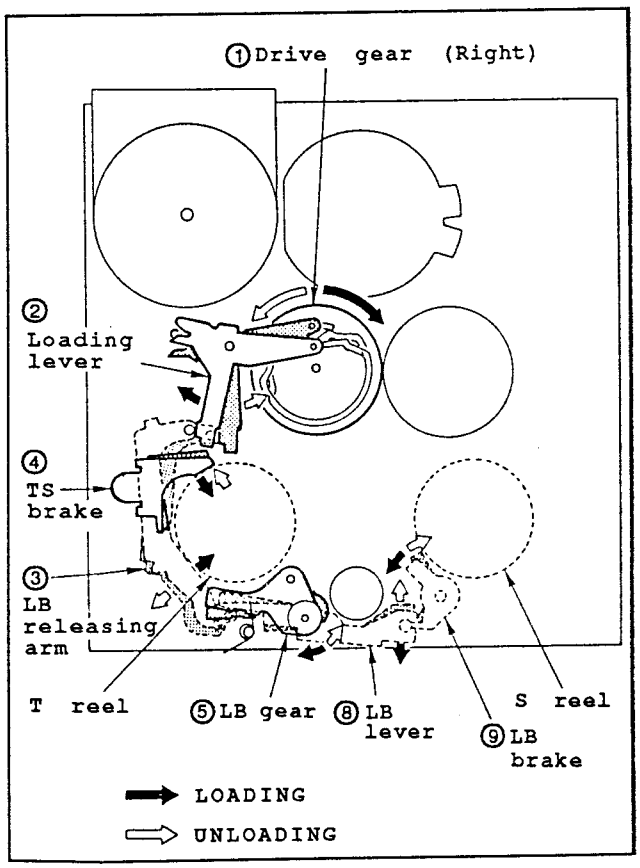


Fig. I-6

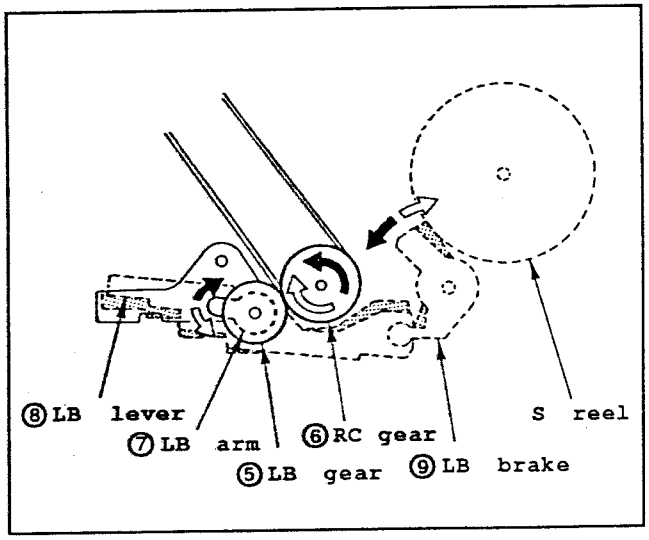


Fig. I-7

2-4 T Brake, S Brake

Drive gear (R) ① rotated

Brake releasing arm ③ moves along cam ②

T brake ④ moves for releasing T reel breaking

S brake ⑤ moved for releasing S reel breaking

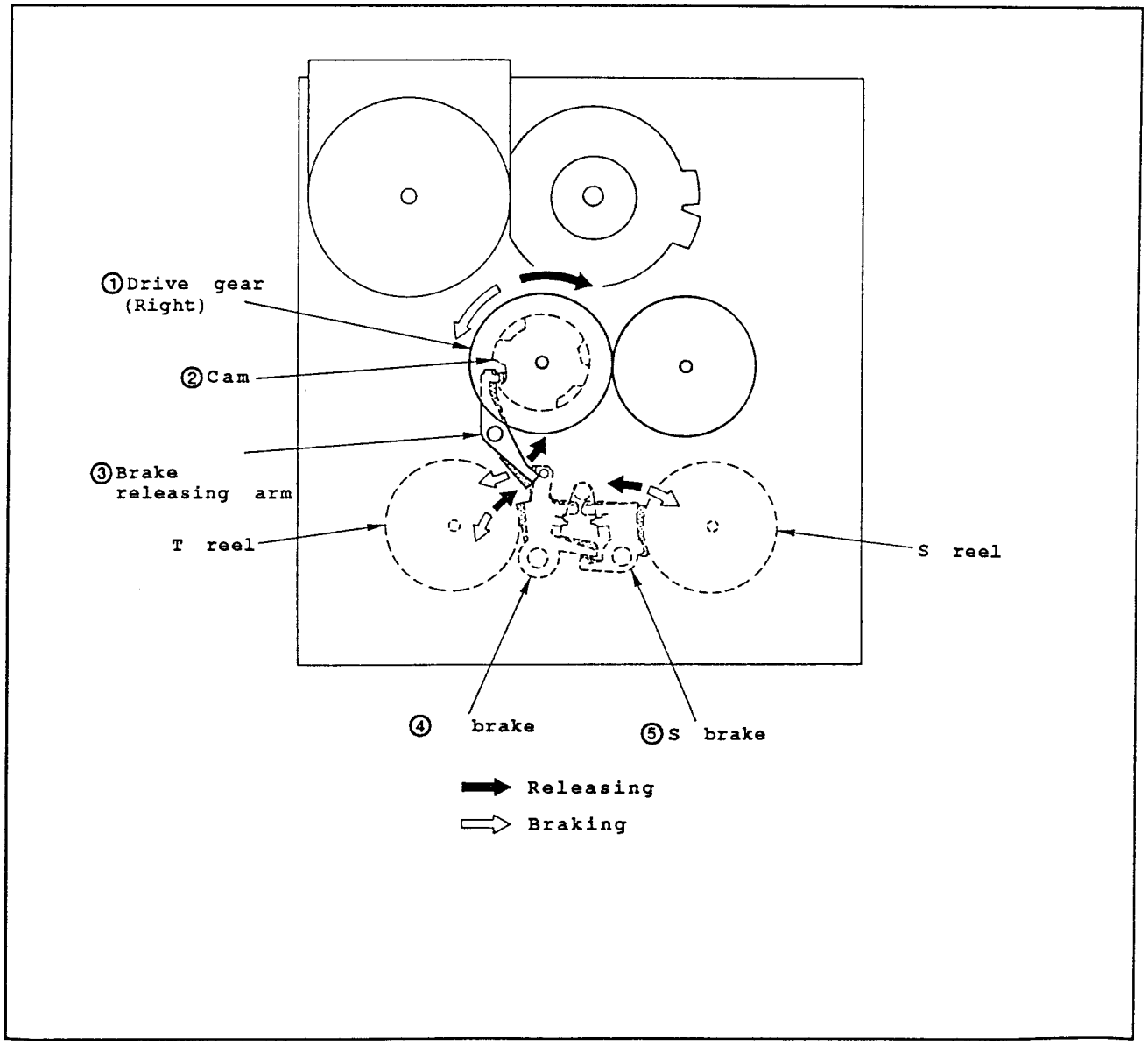
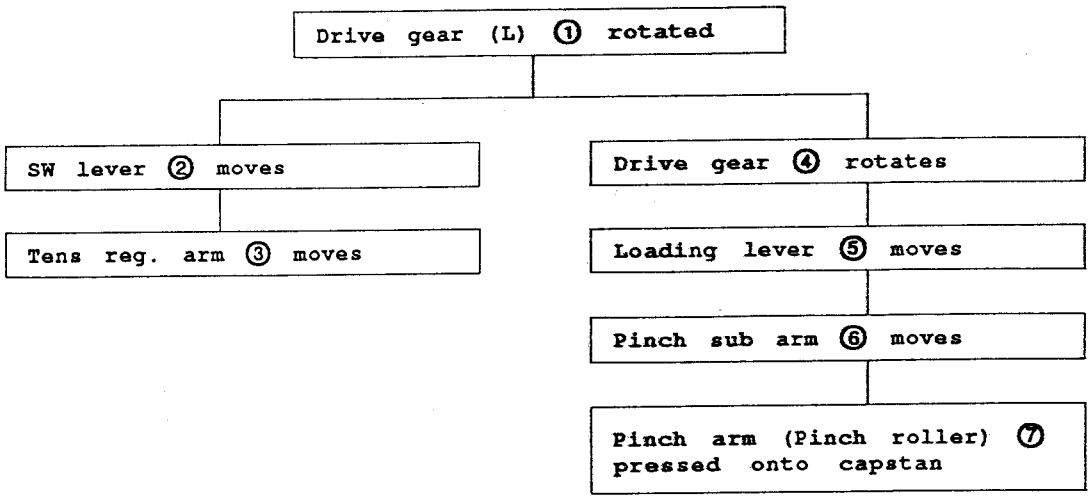


Fig. I-8

2-5 Tension Regulator Arm, Pinch Arm (Pinch Roller)



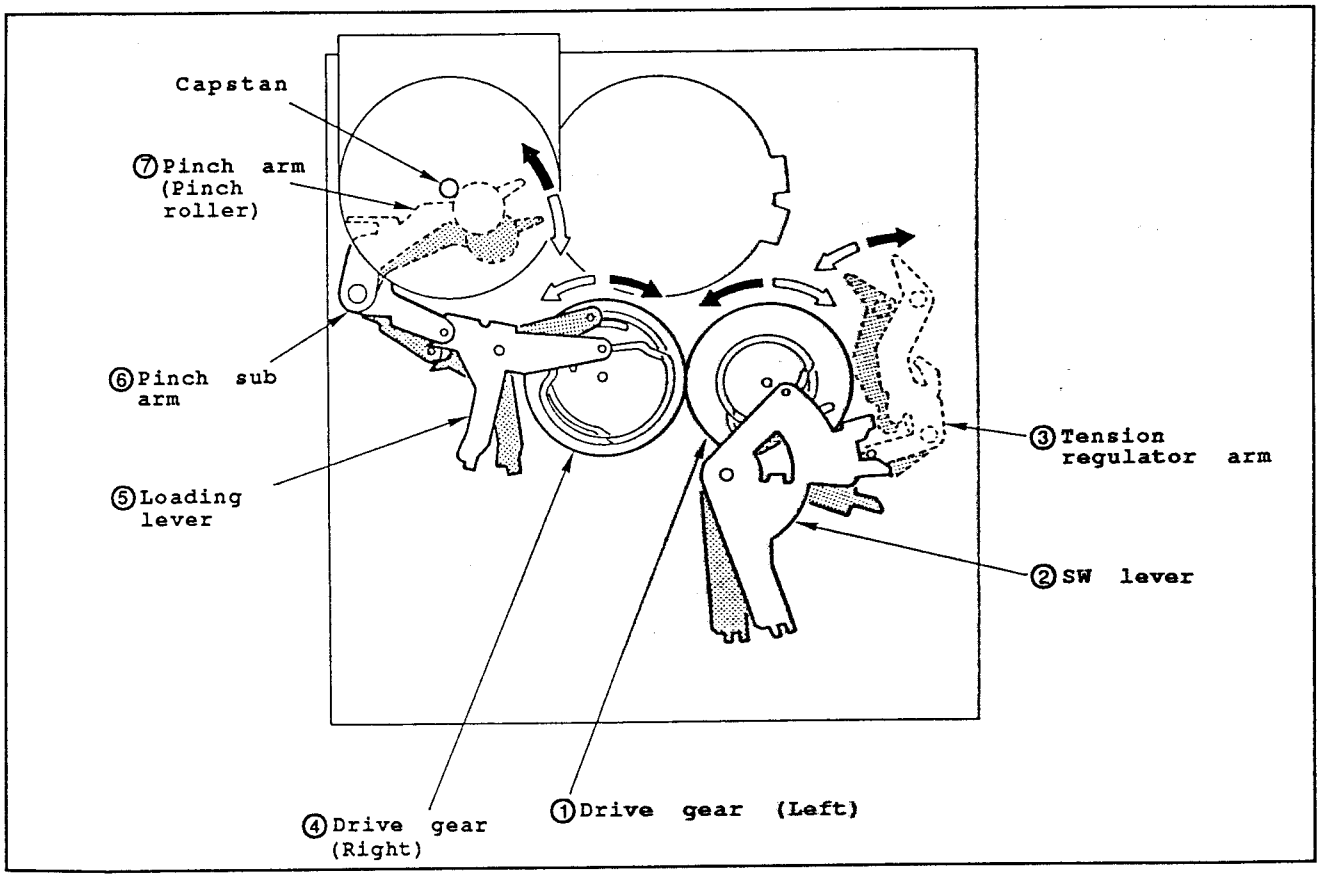
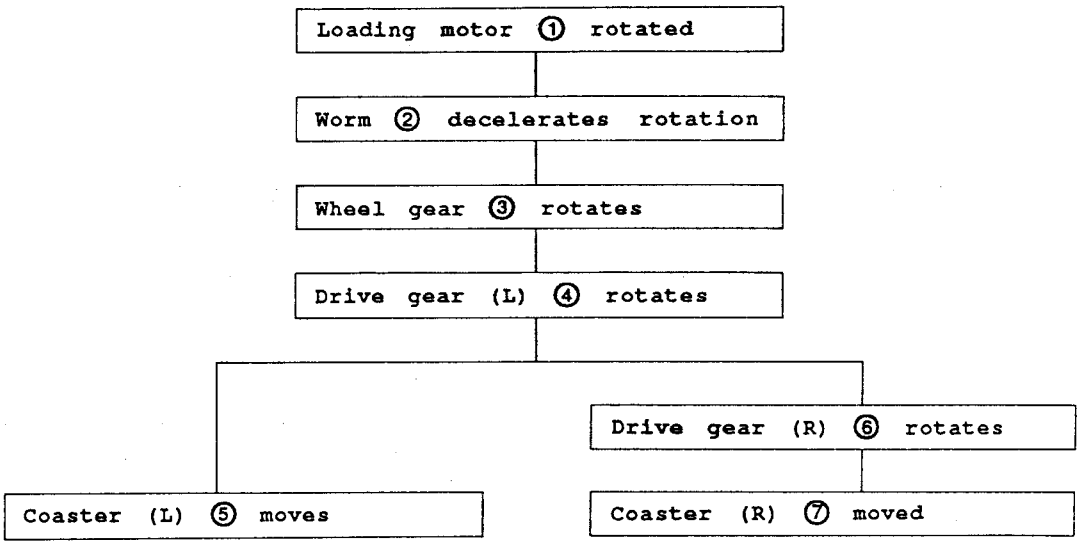


Fig. I-9

2-6 Coasters (Right/Left)



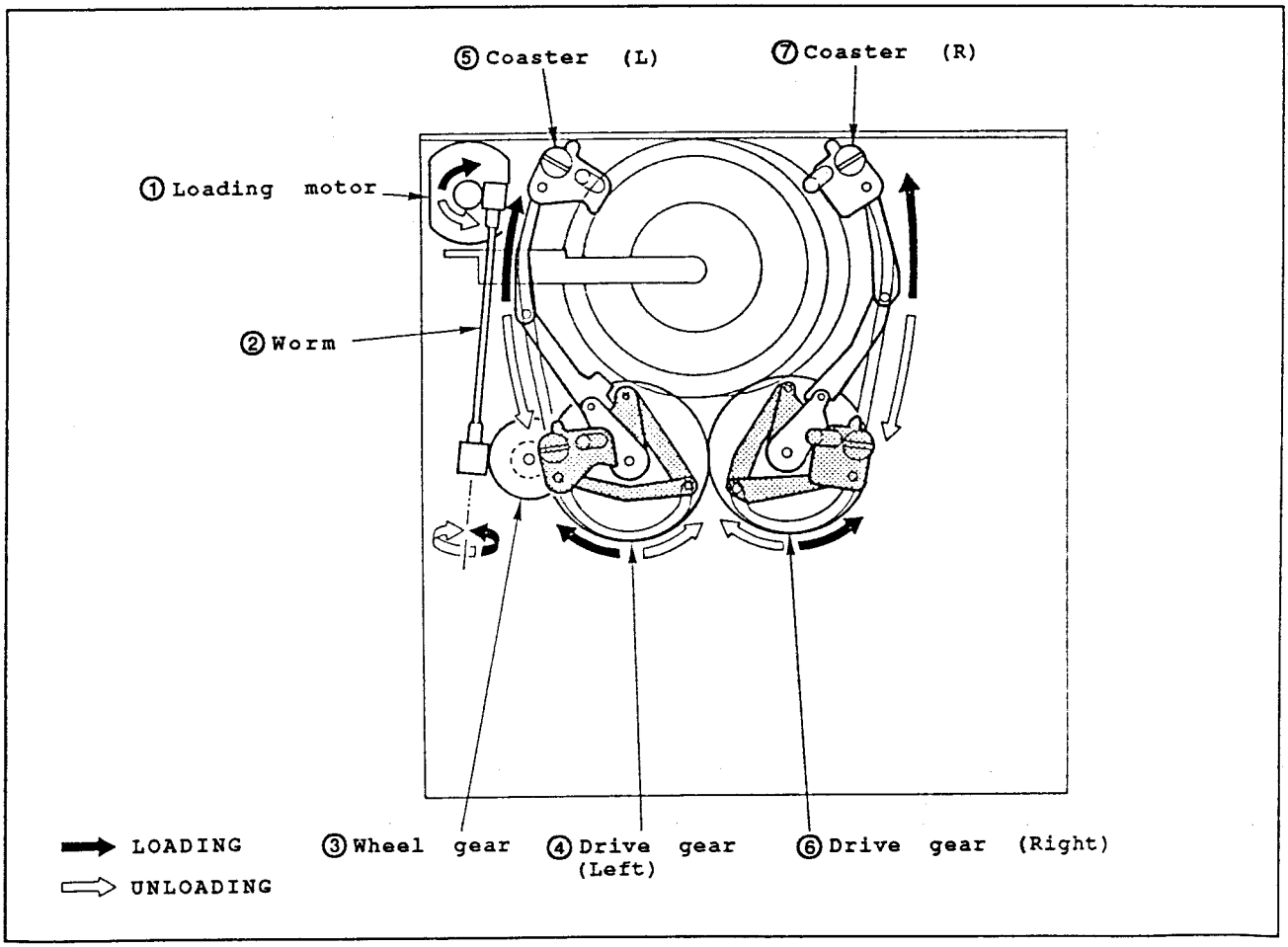
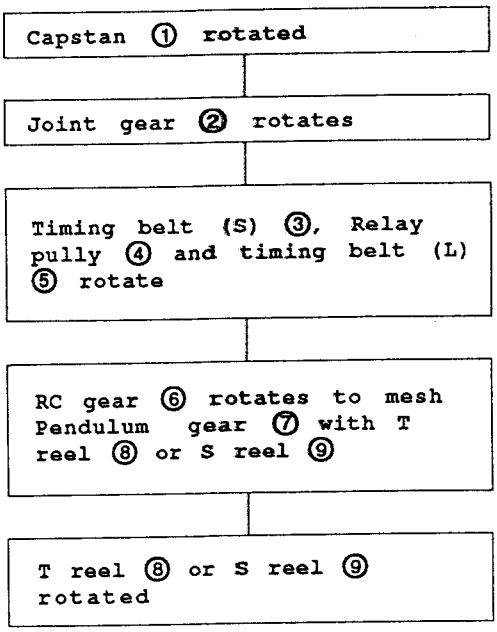


Fig. I-10

2-7 Reel Tables (Take-up/Supply)



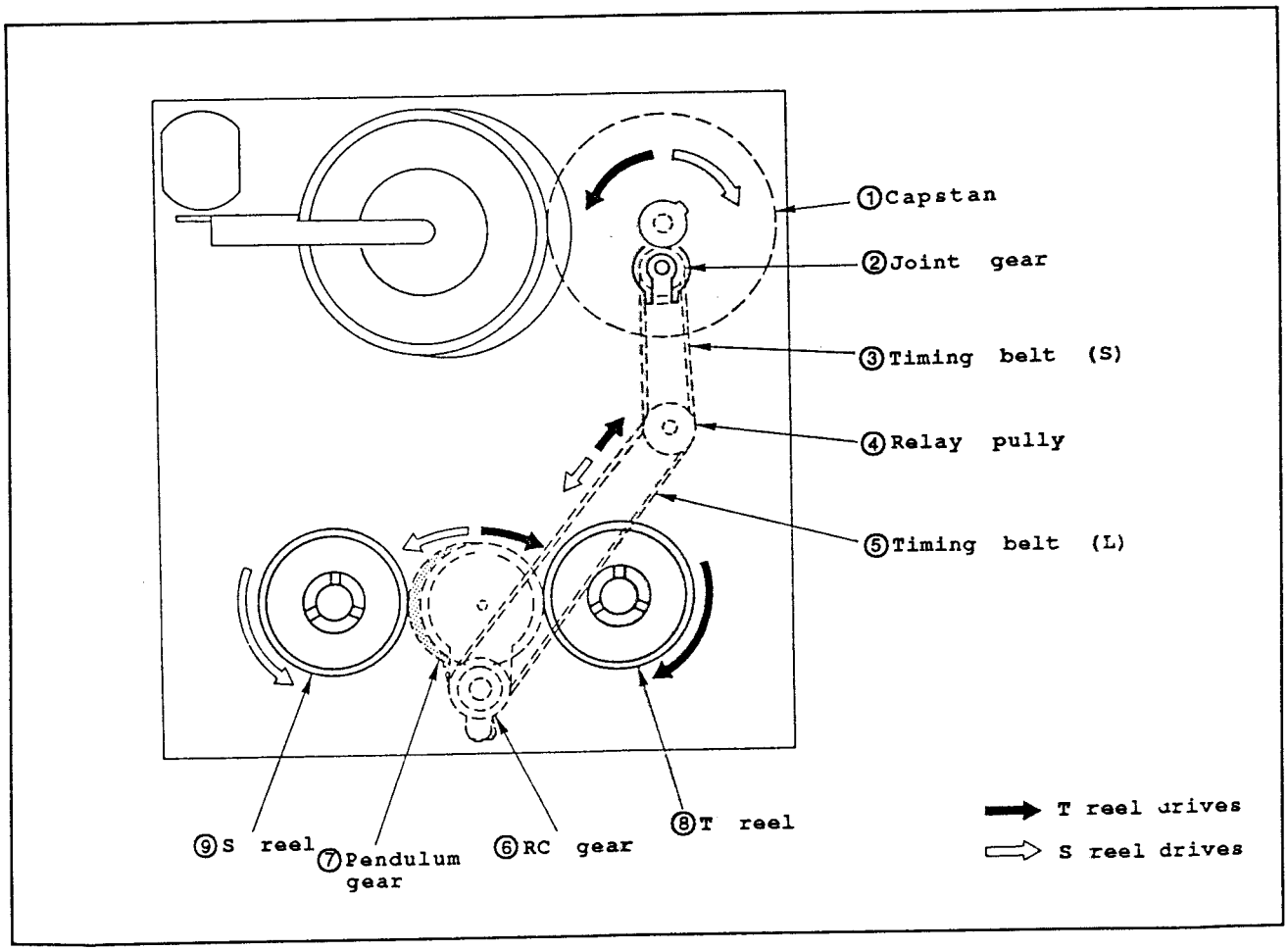


Fig.I-11

3. Each Mode Transition
3-1 Cassette In

Cassette tape is set

Claw ① releases lid locking ②. (By this, Cassette lid becomes openable freely.)

Push cassette comp. ③ toward direction A.

Locking arm ④ moves in direction B to lock cassette compartment ③.

Cassette lid ⑦ opens

Convex part ⑧ released for releasing reel lock. (Tape can be picked up freely.)

Eject lever ⑤ pushed to turn Push SW ⑥ on

Ⓐ

Continued to next page.

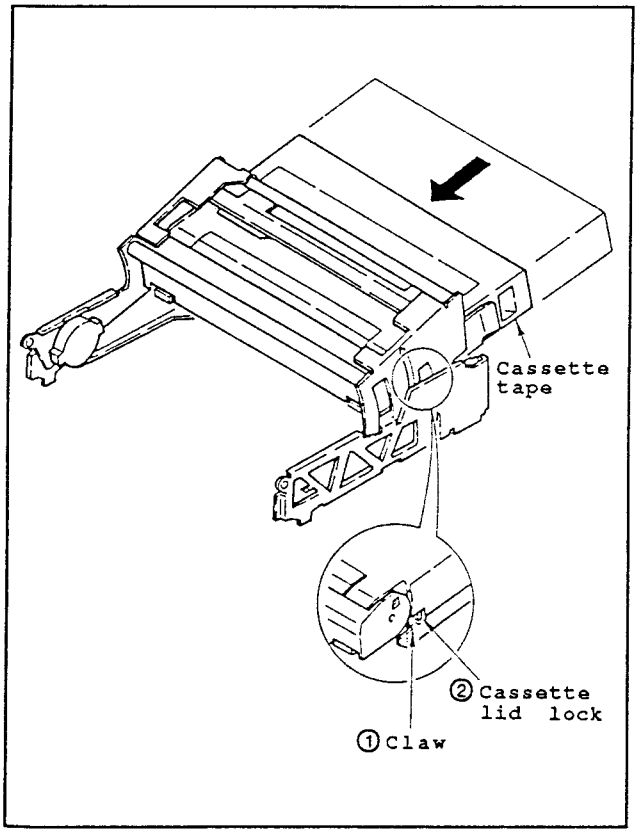


Fig.I-12

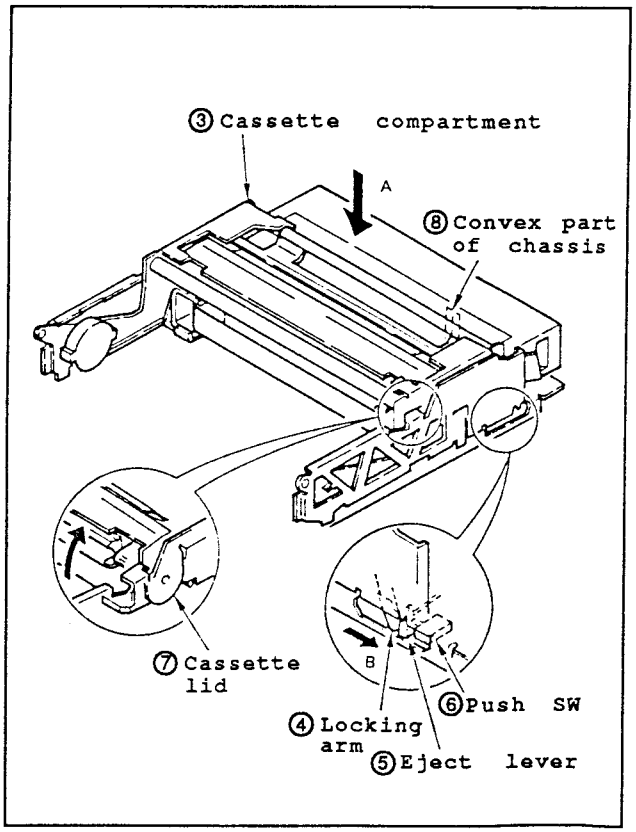
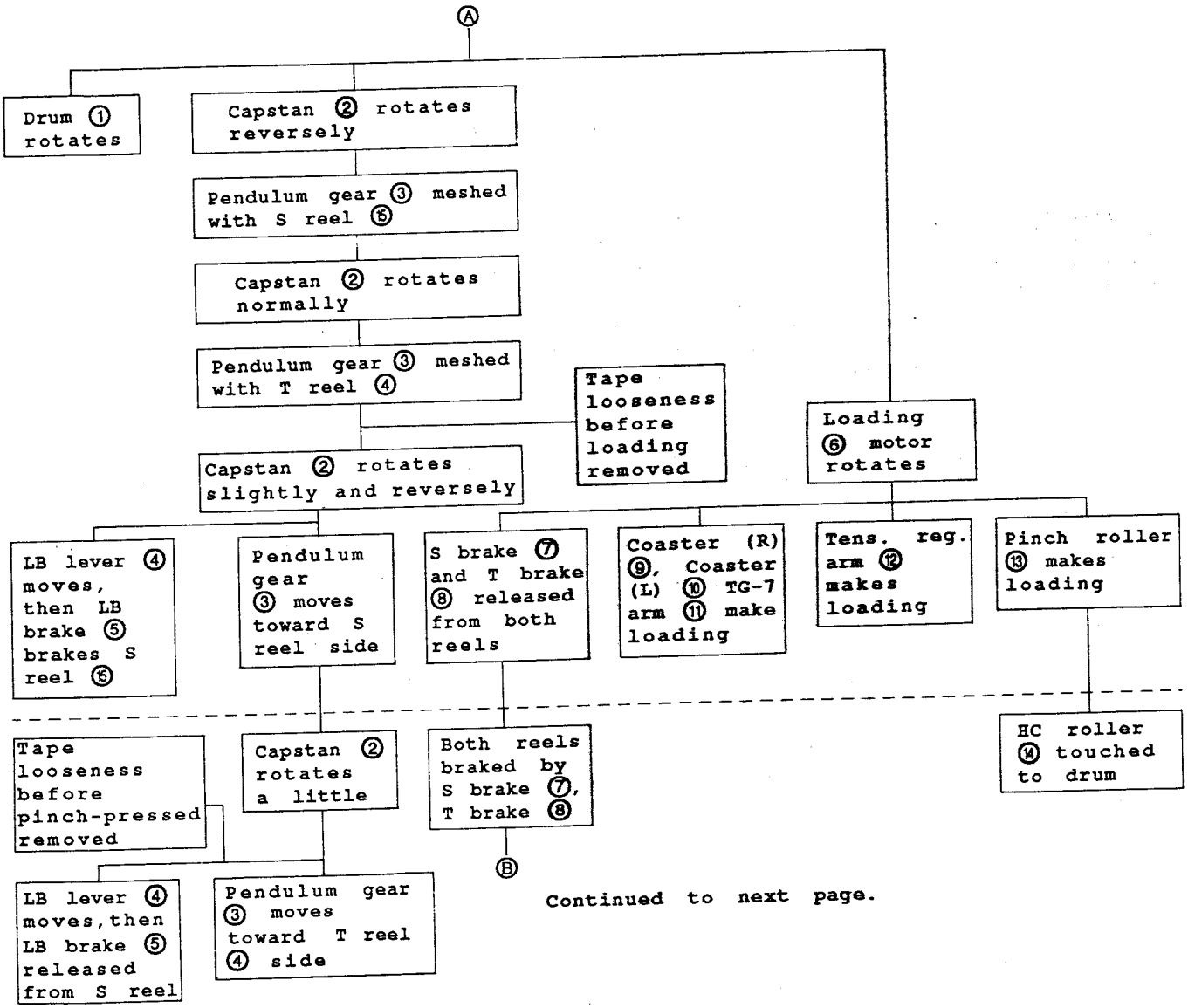


Fig.I-13


Ⓐ
Drum ① rotates
Capstan ② rotates reversely
Pendulum gear ③ meshed with S reel ⑮
Capstan ② rotates normally
Pendulum gear ③ meshed with T reel ④
Capstan ② rotates slightly and reversely
Tape looseness before loading removed
Loading ⑥ motor rotates
LB lever ④ moves, then LB brake ⑤ brakes S reel ⑮
Pendulum gear ③ moves toward S reel side
S brake ⑦ and T brake ⑧ released from both reels
Coaster (R) ⑨, Coaster (L) ⑩ TG-7 arm ⑪ make loading
Tens. reg. arm ⑫ makes loading
Pinch roller ⑬ makes loading
HC roller ⑭ touched to drum
Tape looseness before pinch-pressed removed
Capstan ② rotates a little
Both reels braked by S brake ⑦, T brake ⑧
Ⓑ
LB lever ④ moves, then LB brake ⑤ released from S reel
Pendulum gear ③ moves toward T reel ④ side
Continued to next page.

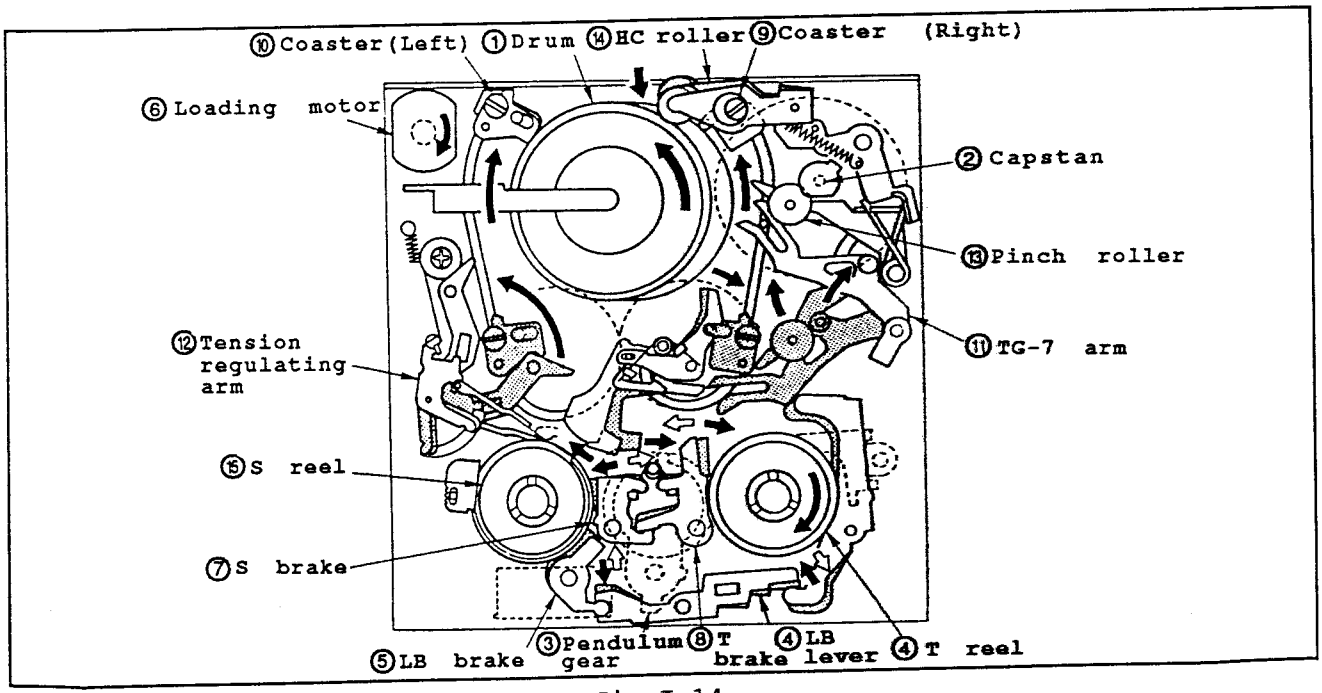
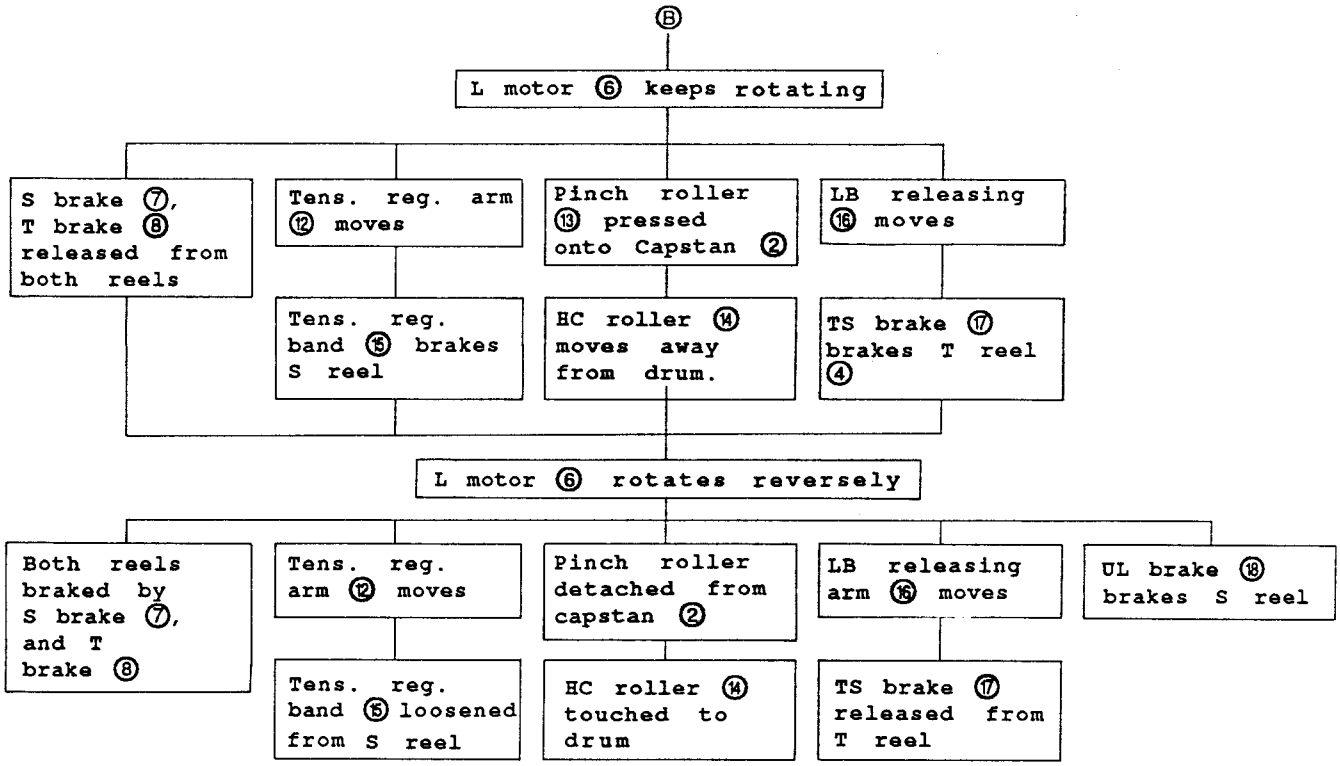

⑩Coaster (Left)
①Drum
⑭HC roller
⑨Coaster (Right)
⑥Loading motor
②Capstan
⑬Pinch roller
⑫Tension regulating arm
⑪TG-7 arm
⑮S reel
⑦S brake
⑤LB brake
③Pendulum gear
⑧T brake
④LB brake lever
④T reel

Fig.I-14


Ⓑ
L motor ⑥ keeps rotating
S brake ⑦, T brake ⑧ released from both reels
Tens. reg. arm ⑫ moves
Pinch roller ⑬ pressed onto Capstan ②
LB releasing ⑯ moves
Tens. reg. band ⑮ brakes S reel
HC roller ⑭ moves away from drum.
TS brake ⑰ brakes T reel ④
L motor ⑥ rotates reversely
Both reels braked by S brake ⑦, and T brake ⑧
Tens. reg. arm ⑫ moves
Pinch roller detached from capstan ②
LB releasing arm ⑯ moves
UL brake ⑱ brakes S reel
Tens. reg. band ⑮ loosened from S reel
HC roller ⑭ touched to drum
TS brake ⑰ released from T reel

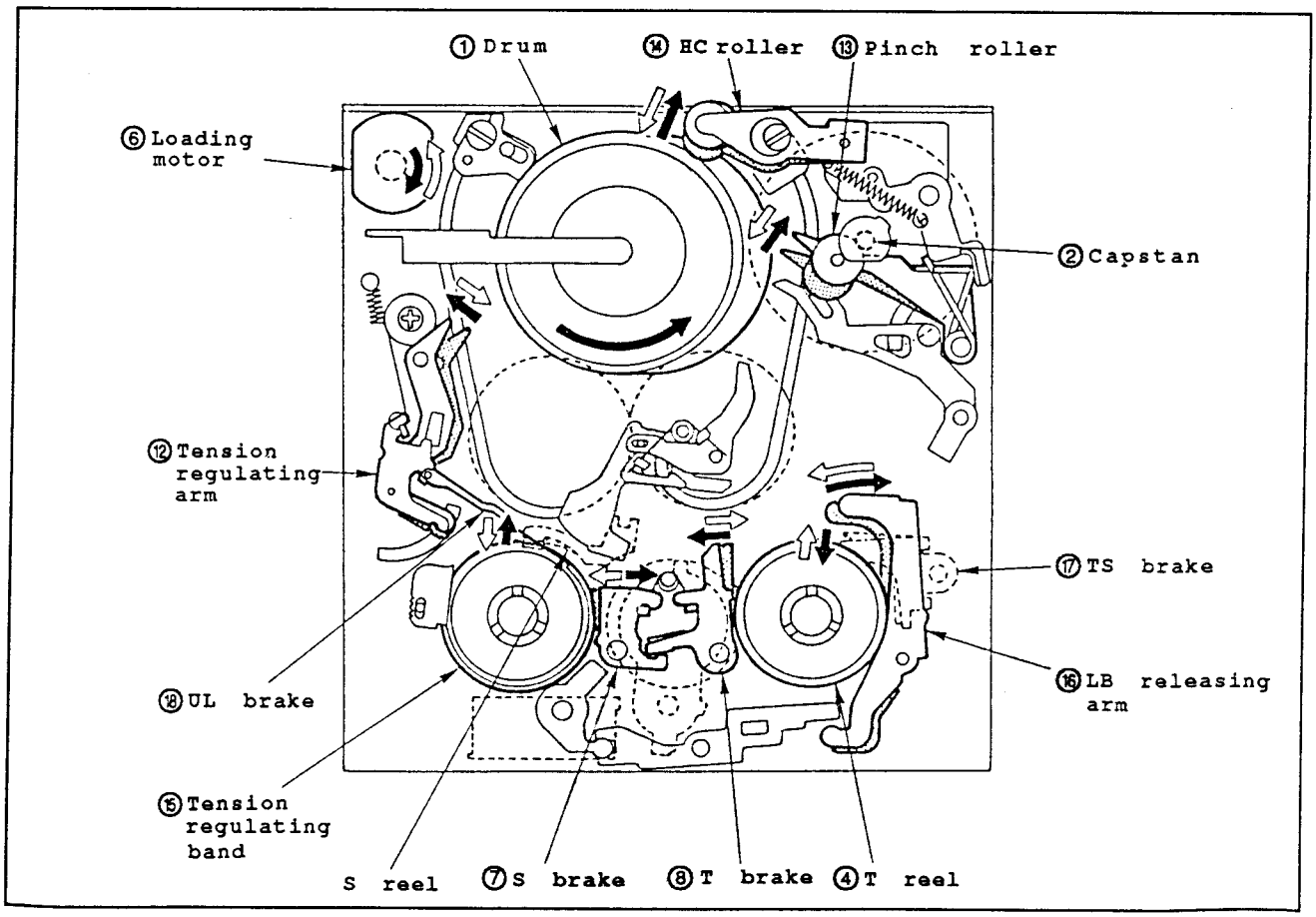
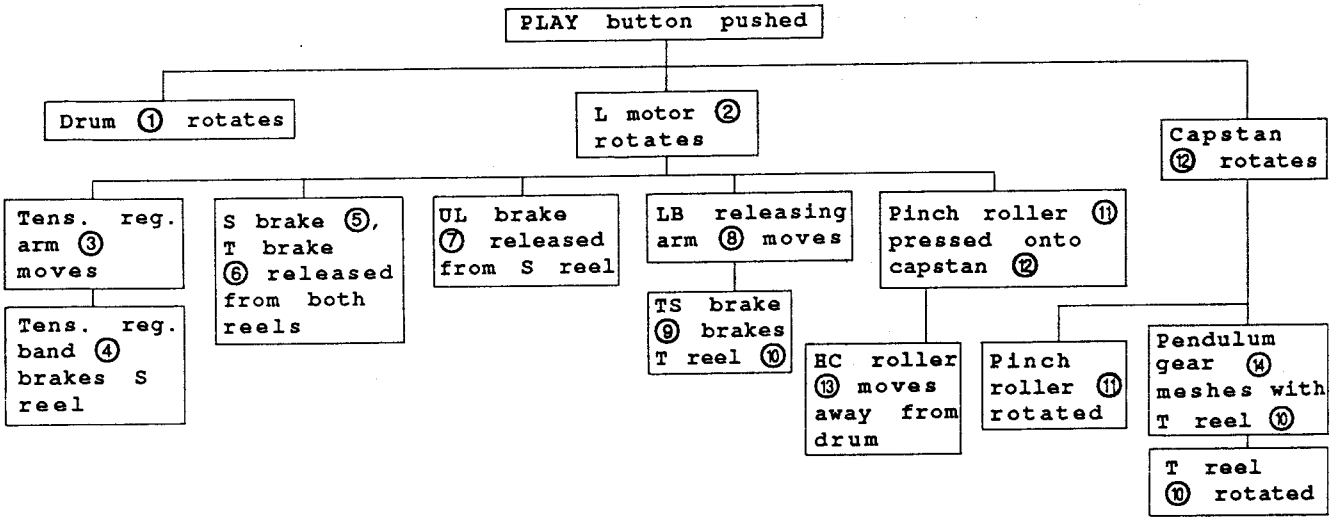

① Drum
⑭ HC roller
⑬ Pinch roller
⑥ Loading motor
② Capstan
⑫ Tension regulating arm
⑰ TS brake
⑯ LB releasing arm
⑱ UL brake
⑮ Tension regulating band
S reel
⑦ S brake
⑧ T brake
④ T reel

Fig.I-15

3-2 Play



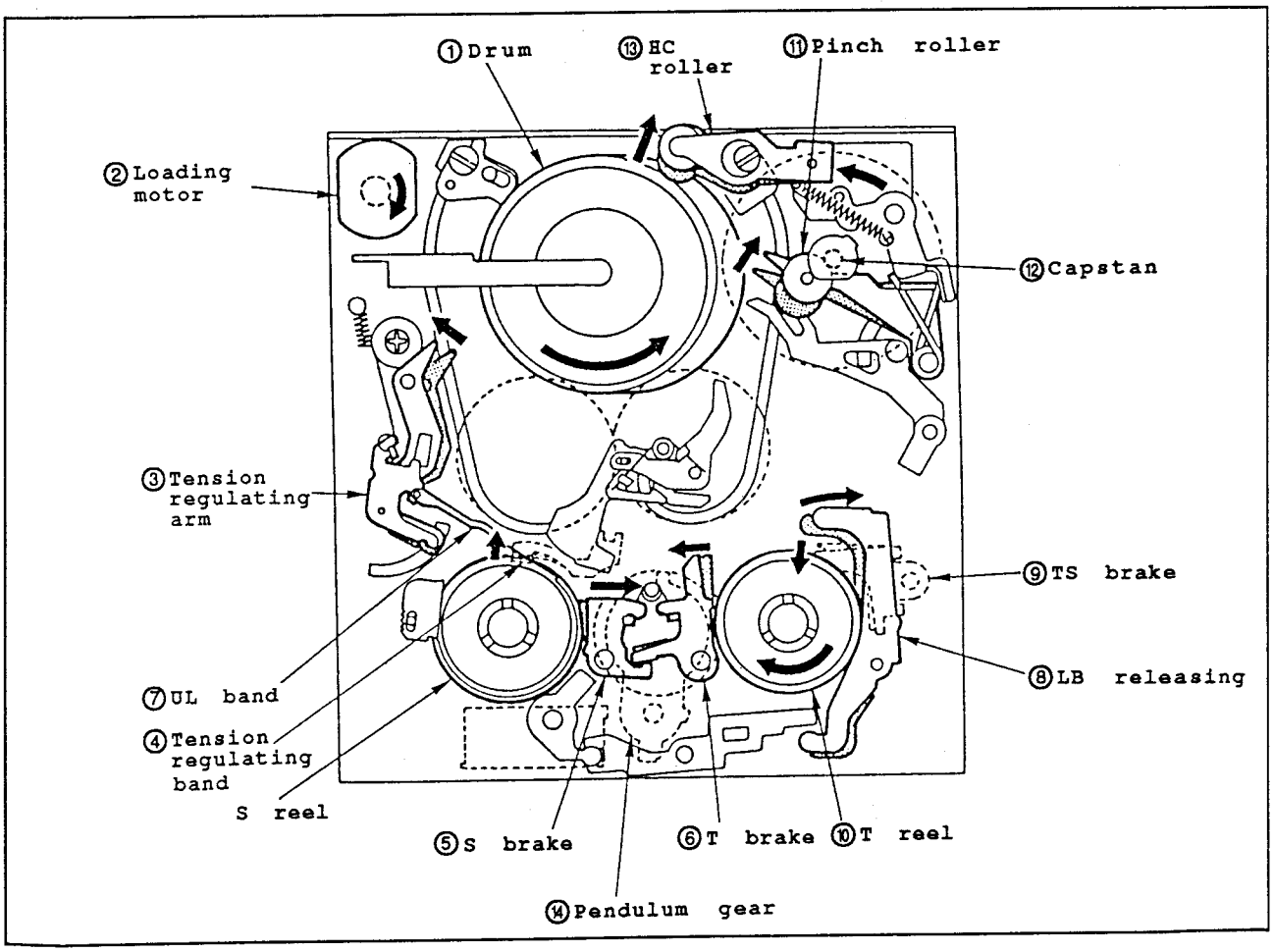


Fig.I-16

3-3 Tape Path

Tape pulled from S reel ①

Tension applied to tape by tens. reg. arm ②

Tape runs along TG-2 roller guide ③

Tape runs along TG-3 ④, then tilted by coaster (L) ⑤

Tape wound on drum ⑥

Tape tilt removed by coaster. (R) ①, then runs along TG-6 ⑧

Tape runs between capstan ⑨ and pinch roller ⑩ pressed

Tape runs along TG-7 ⑪

Tape taken up by T reel ⑫

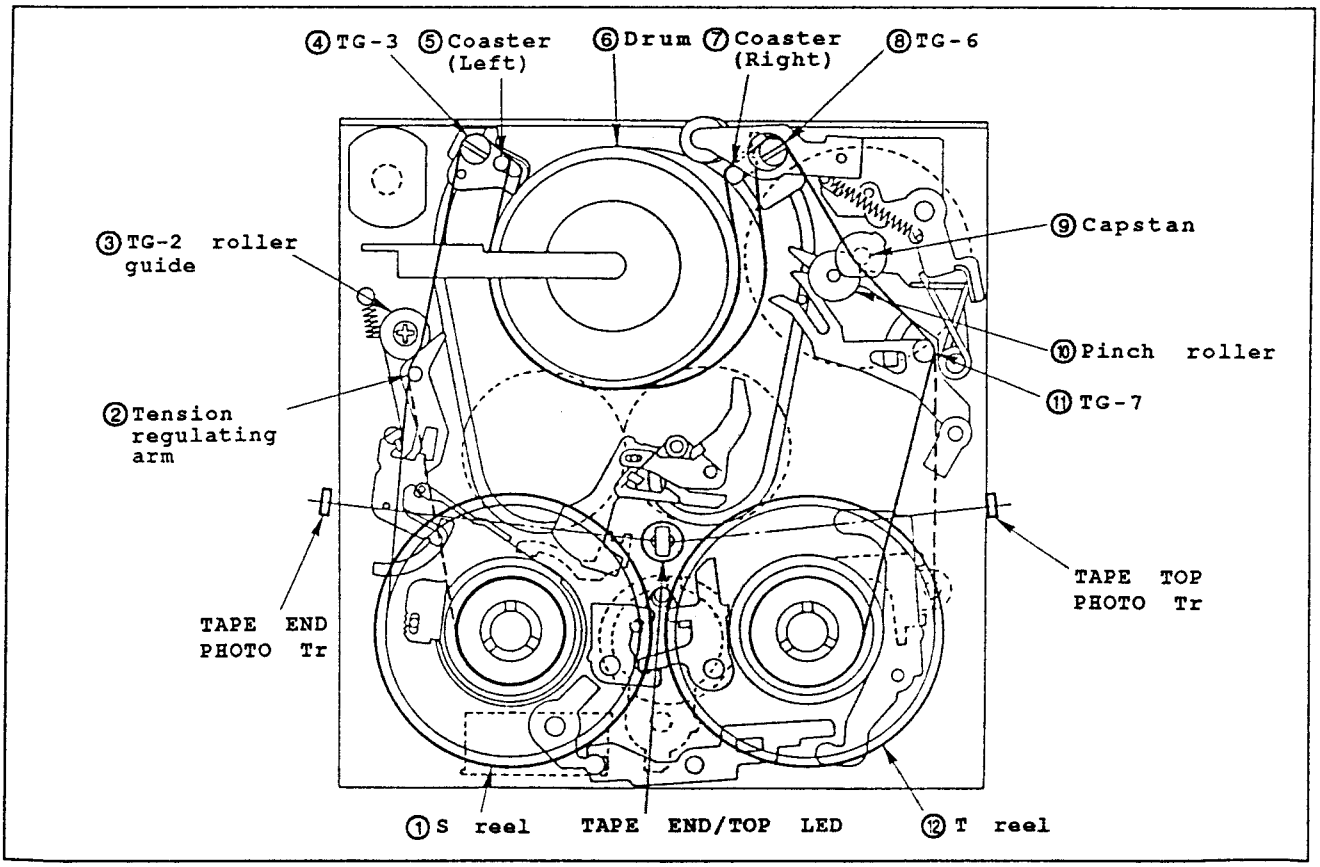
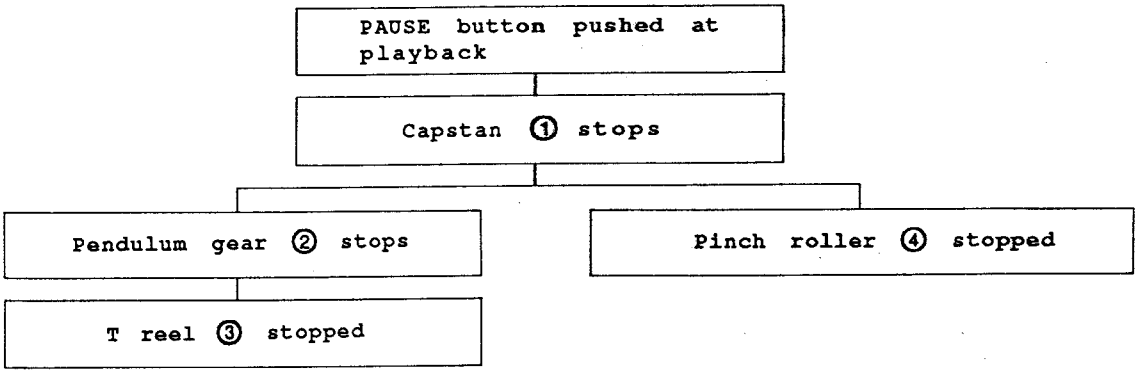


Fig.I-17

3-4 Pause



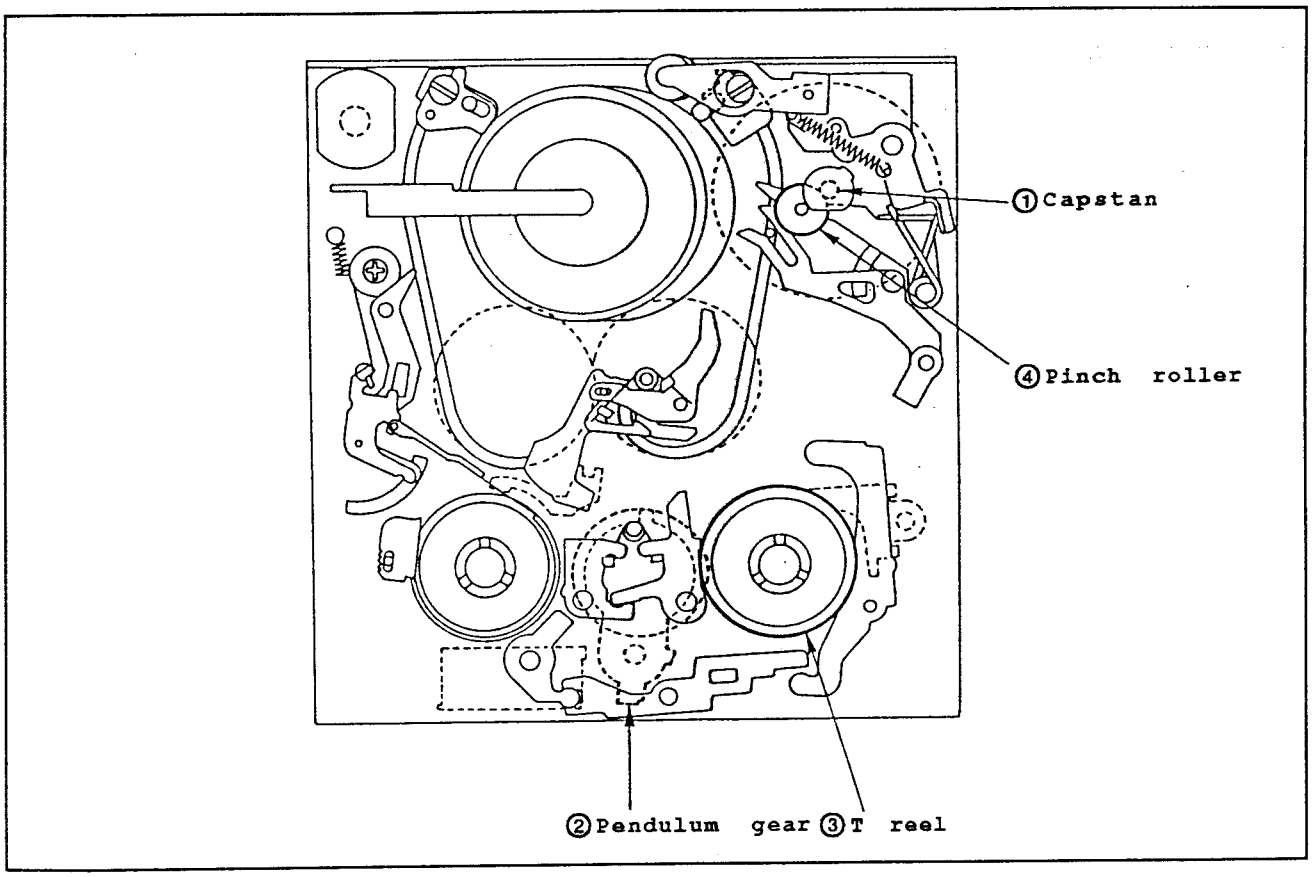
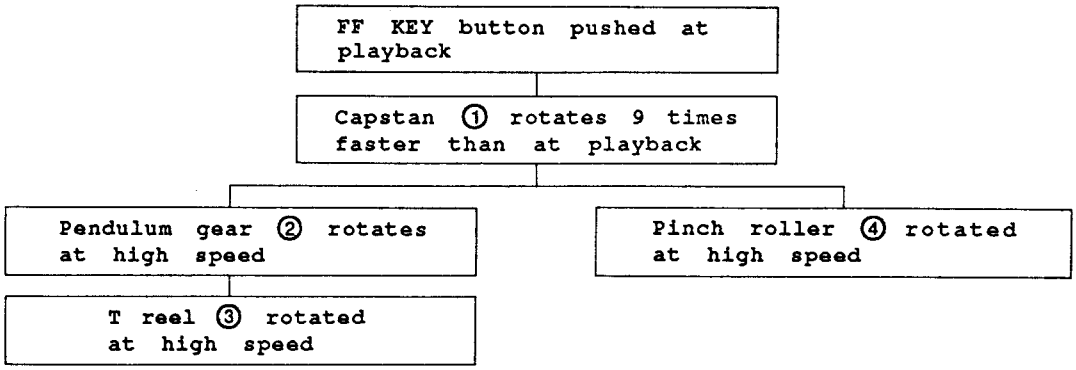


Fig.I-18

3-5 CUE



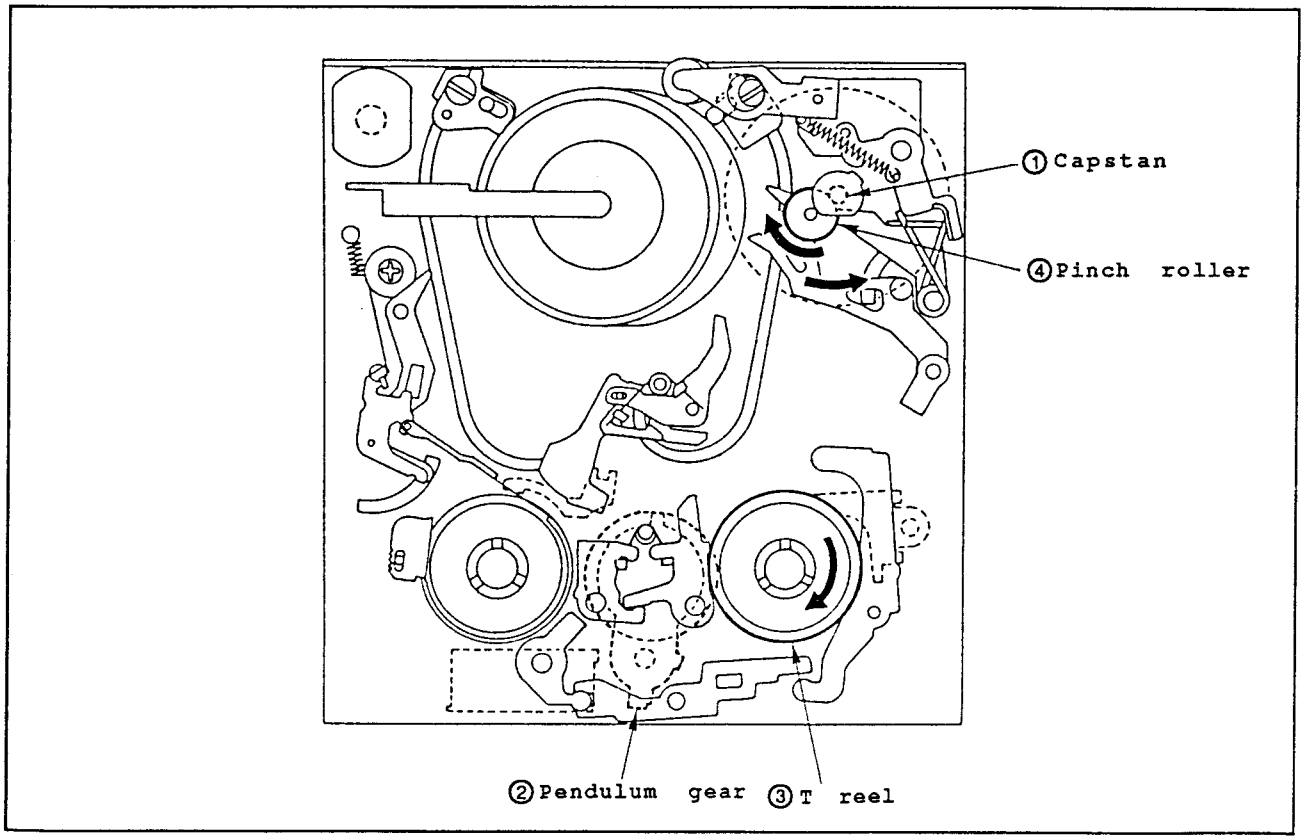


Fig.I-19

3-6 REV

REV KEY button pushed at playback

Capstan ① rotates reversely 7 times faster than at playback

Pendulum gear ② moves to be meshed with S reel ③

S reel ③ rotated at high speed

Pinch roller ④ rotated reversely at high speed

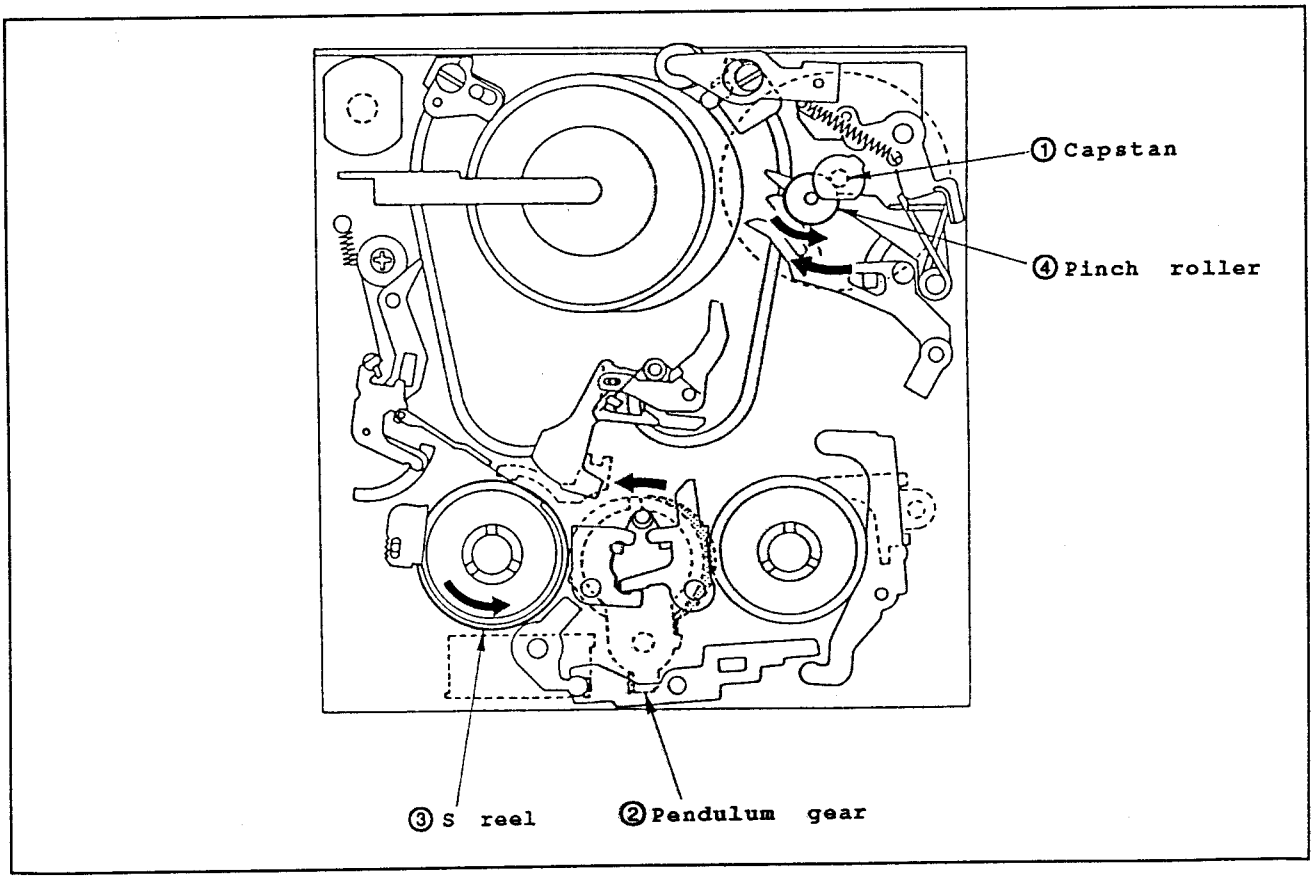
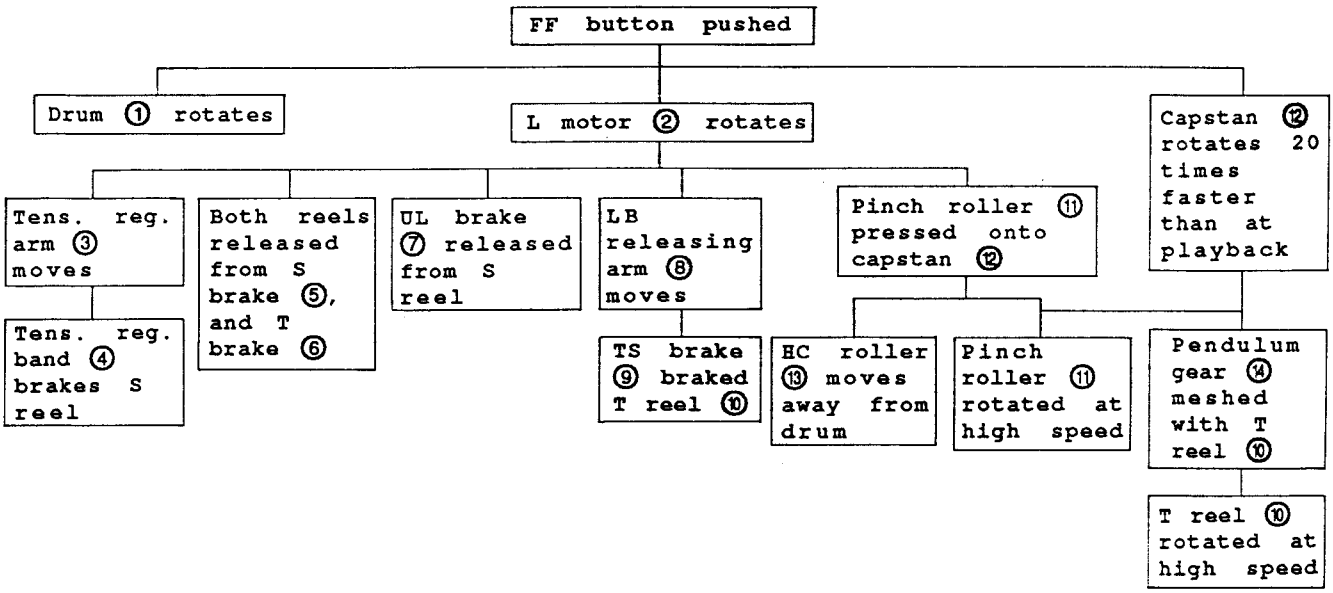


Fig.I-20

3-7 F.F


FF button pushed
Drum ① rotates
L motor ② rotates
Capstan ⑫ rotates 20 times faster than at playback
Tens. reg. arm ③ moves
Both reels released from S brake ⑤, and T brake ⑥
UL brake ⑦ released from S reel
LB releasing arm ⑧ moves
Pinch roller ⑪ pressed onto capstan ⑫
Tens. reg. band ④ brakes S reel
TS brake ⑨ braked T reel ⑩
HC roller ⑬ moves away from drum
Pinch roller ⑪ rotated at high speed
Pendulum gear ⑭ meshed with T reel ⑩
T reel ⑩ rotated at high speed

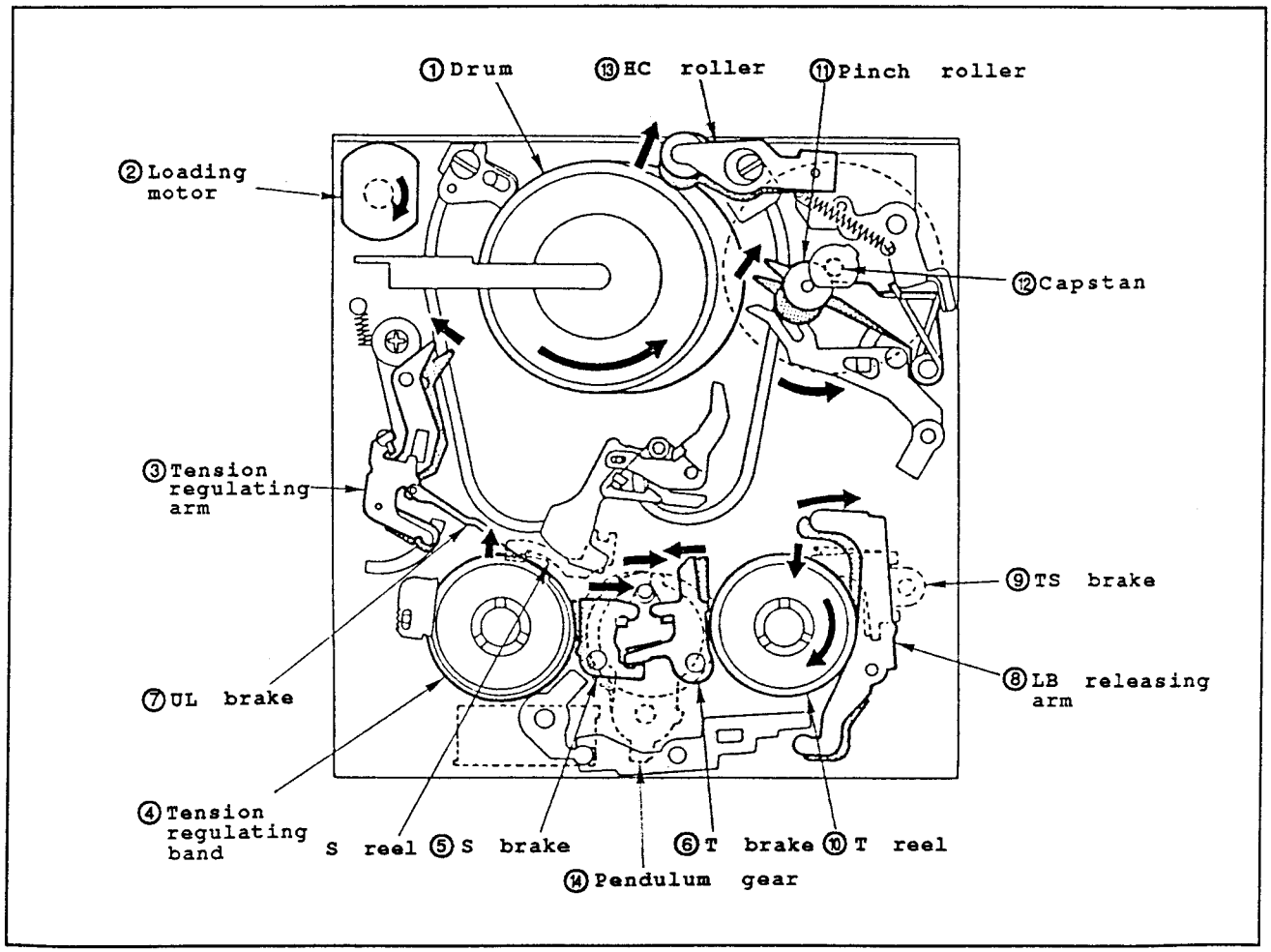
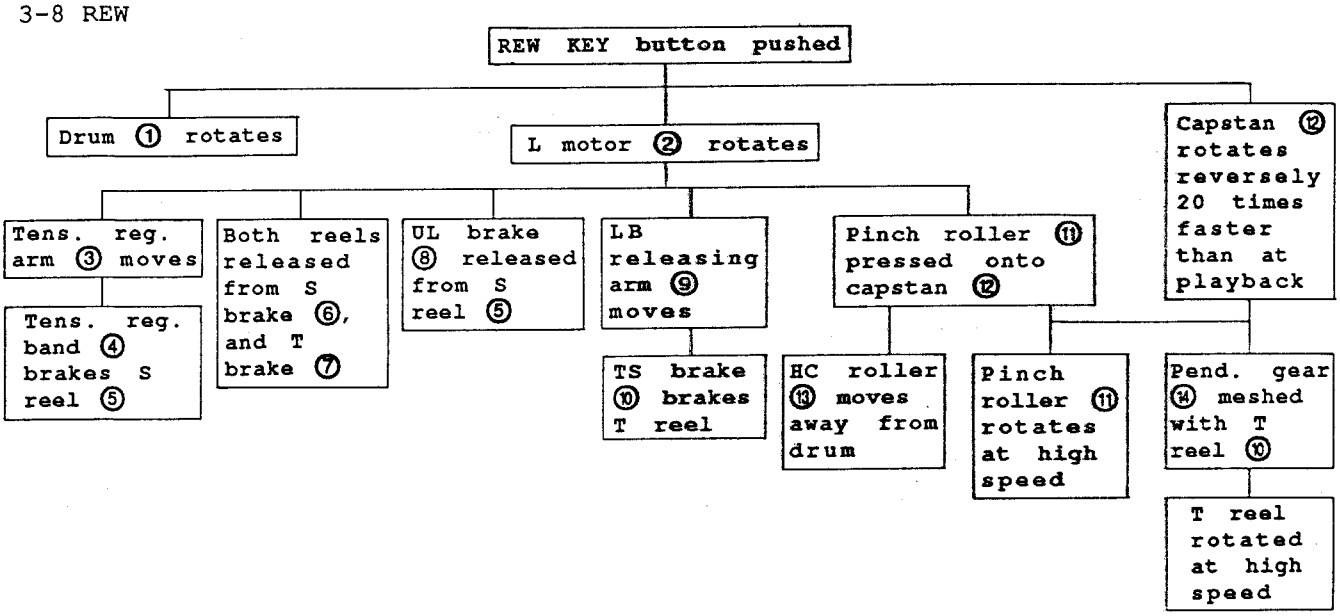

①Drum
⑬HC roller
⑪Pinch roller
②Loading motor
⑫Capstan
③Tension regulating arm
⑨TS brake
⑧LB releasing arm
⑦UL brake
④Tension regulating band
S reel ⑤S brake
⑥T brake ⑩T reel
⑭Pendulum gear

Fig.I-21

3-8 REW



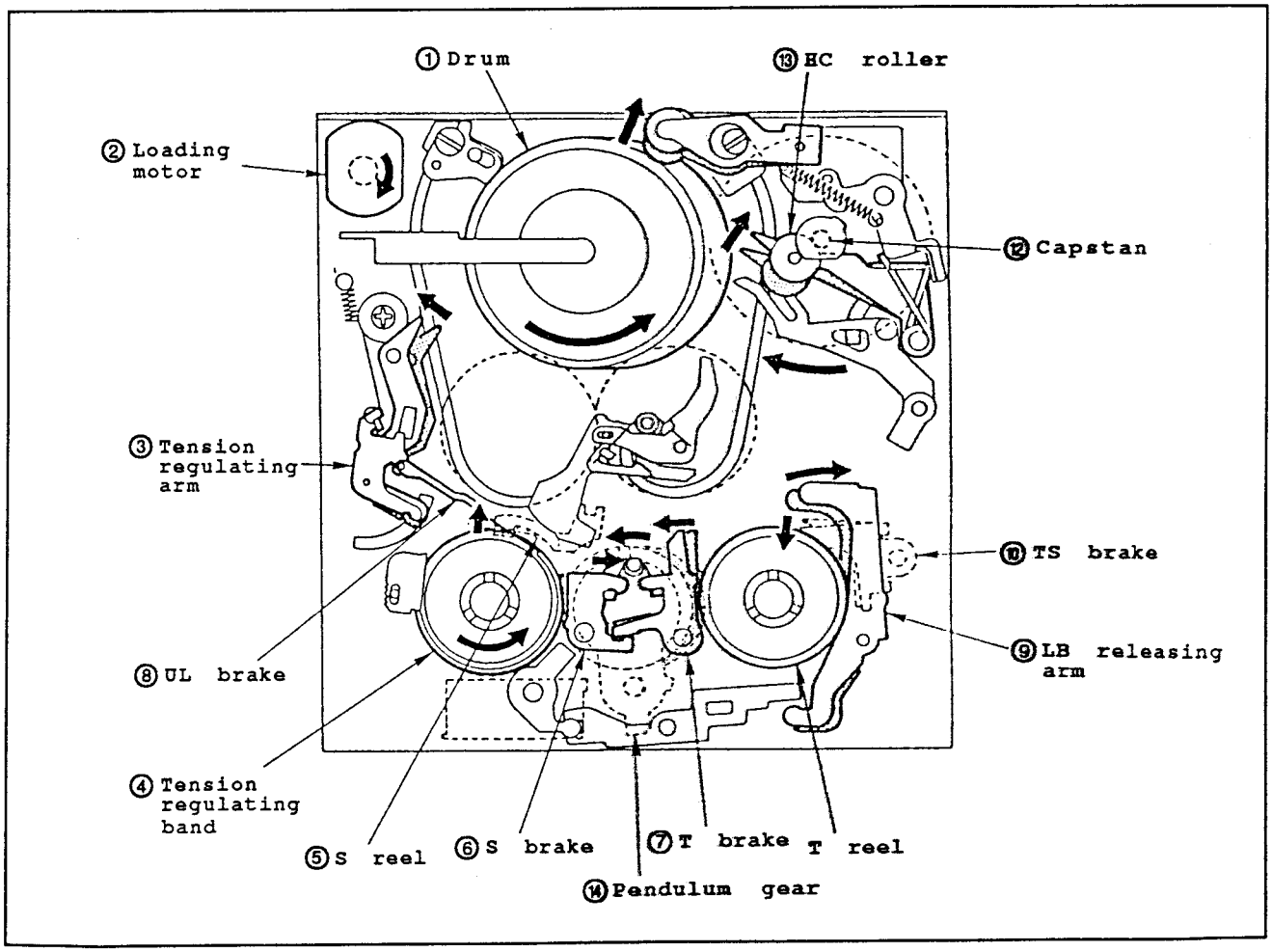
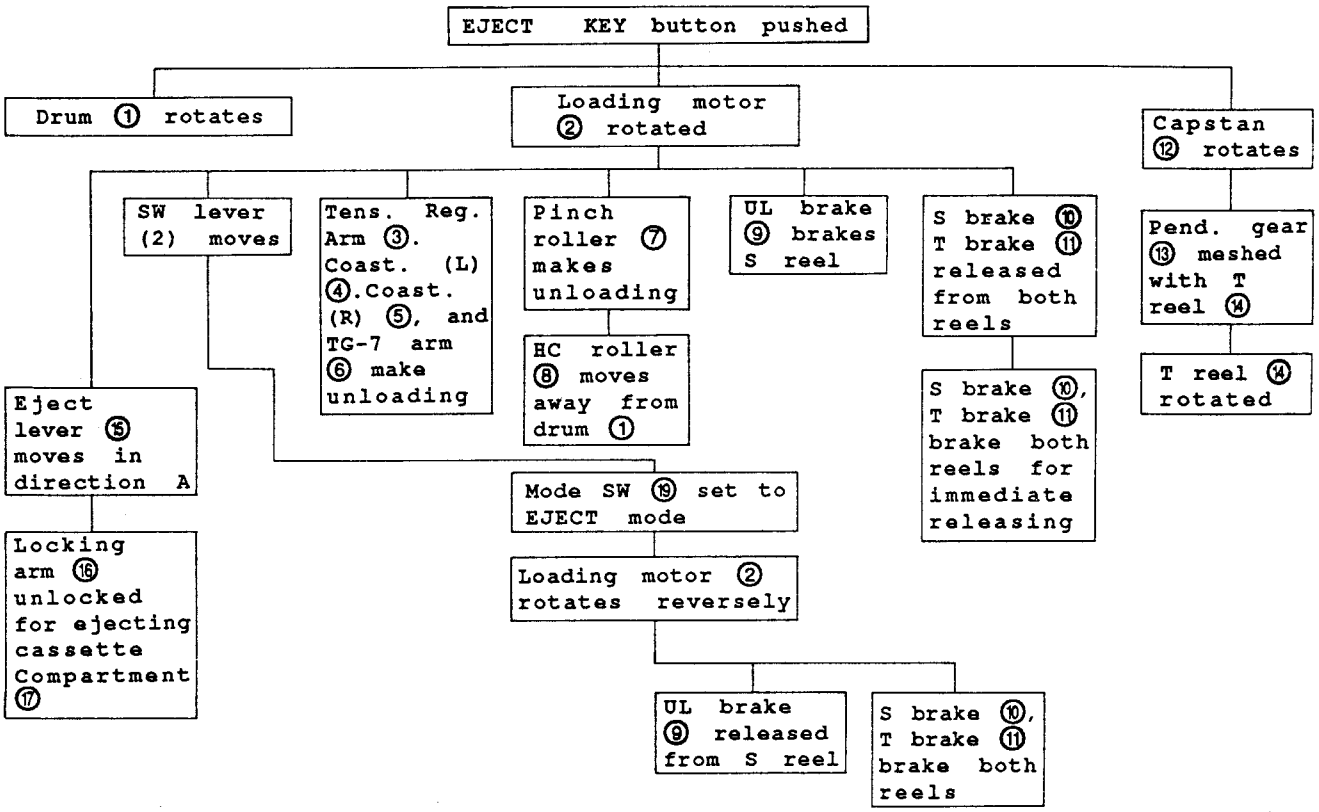


Fig.I-22

3-9 EJECT



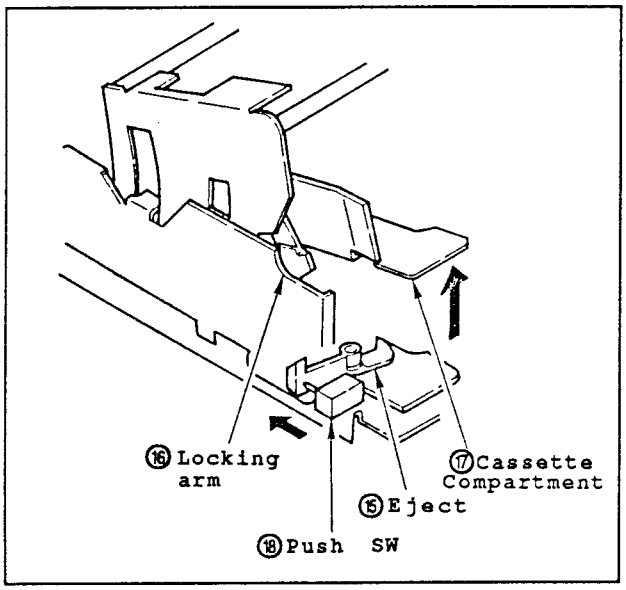


Fig.I-23

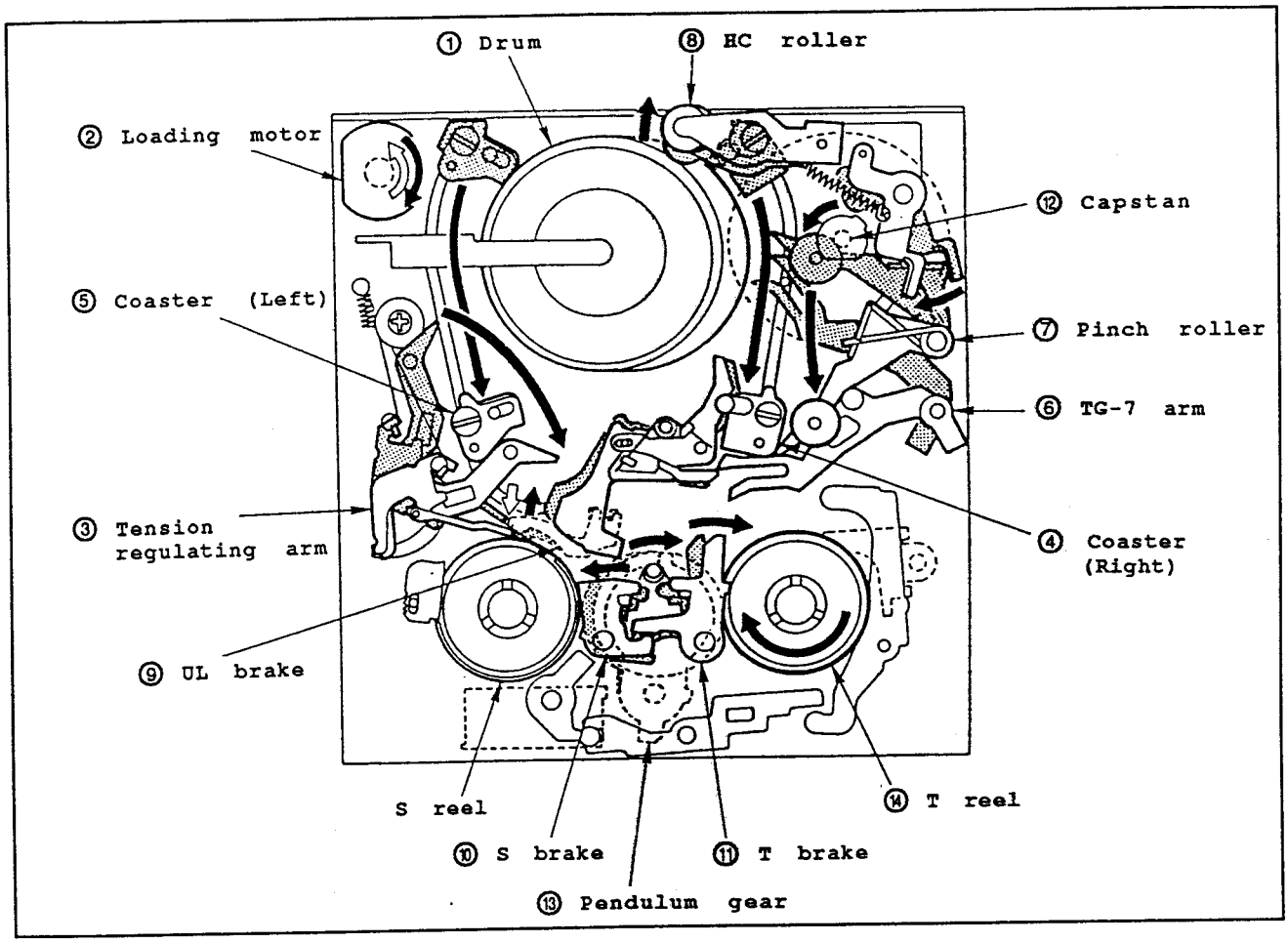

① Drum
⑧ HC roller
② Loading motor
⑫ Capstan
⑤ Coaster (Left)
⑦ Pinch roller
⑥ TG-7 arm
③ Tension regulating arm
④ Coaster (Right)
⑨ UL brake
S reel
⑭ T reel
⑩ S brake
⑪ T brake
⑬ Pendulum gear

Fig.I-24

Chapter 2 Adjustments/Replacement

1. Recorder Section Mechanical Check/Adjustment

*Note: For details, i.e. removal of covers, C.B.A.S, location of test points, etc., refer to the service manual of product which equips this mechanism.

1-1 List of Maintenance Tools and Supplies

Maintenance Tools

Description	Tool No.	Remarks
Cassette Torque Gauge for 8mm	DY9-1047-000	
Alignment Tape K (Tracking B)	DY9-1085-000	New (for NTSC)
Alignment Tape L (Tracking C)	DY9-1086-000	New (for PAL/SECAM)
Hexagonal wrench (0.89mm)		New (Commercially available)
Rotary drum jig kit		Enclosed in repair kit

Supplies

Description	Tool No.	Remarks
Lens Tissue K-1, K-3	CY9-4023-003	Camera Service Dept.
Molyton Grease	DY9-3009-000	
Hydroflud NT-68	DY9-3010-000	*See the note below
Ethyl alcohol		Commercially available

*Note: In U.S.A., contact video service Div., Canon U.S.A., Inc. for ordering.

1-2 Removal of cassette Compartment Assembly (Fig.II-1)

(1) Remove setscrews ① and ②.
(2) To detach cassette compartment assembly, slide the assembly a little toward you. (Ⓐ parts in Fig.II-1 detached)
Then take out the assembly.

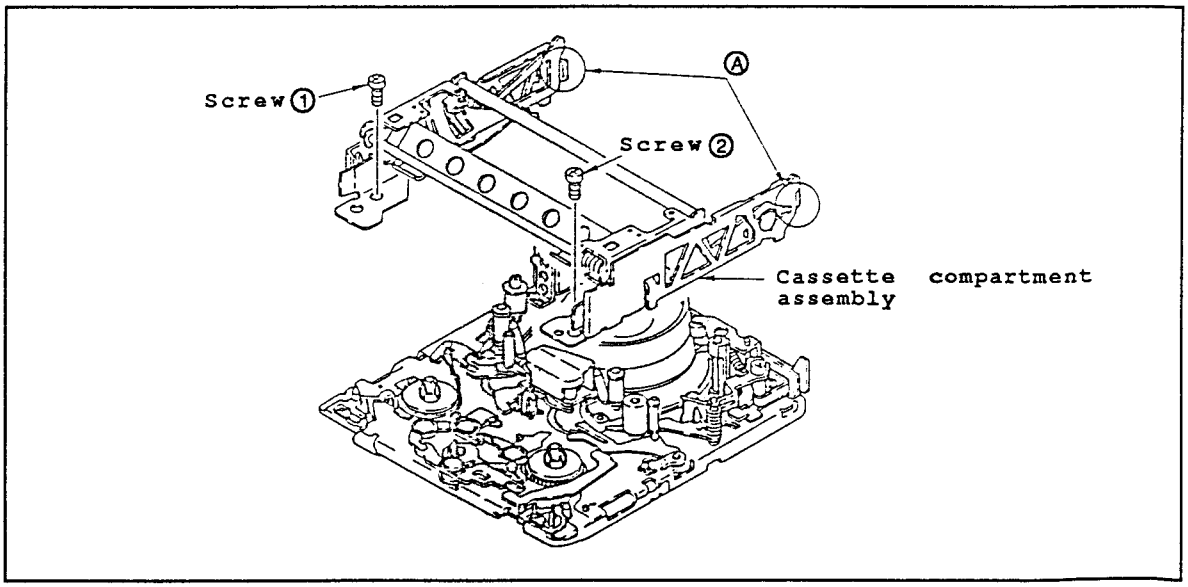


Fig.II-1

1-3 Tape Loading/Play without LS cassette Compartment Assembly and Tape

*Note: Remove a strong light source when performing the followings.
If performed near the strong light source, a tape sensor misoperated.

1-3-1 Loading (Fig.II-2)

(1) Cover a tape sensor LED with an opaque cap ① or equivalent.
(2) To press a pin, attach a tape onto the Recog. switch ②.
(3) Move the Eject lever ③ in the direction of Ⓐ.

1-3-2 Play (Fig. II-2)

(1) Set loading state.
(2) Snap a rubber band ④ around the S and T reels.
(3) To rotate T reel, push the play Key Switch.
When the tape starts moving, push the tension regulating arm ⑤ in the direction of Ⓑ. (At this time, the tension regulating band is released, and the S reel moves.)

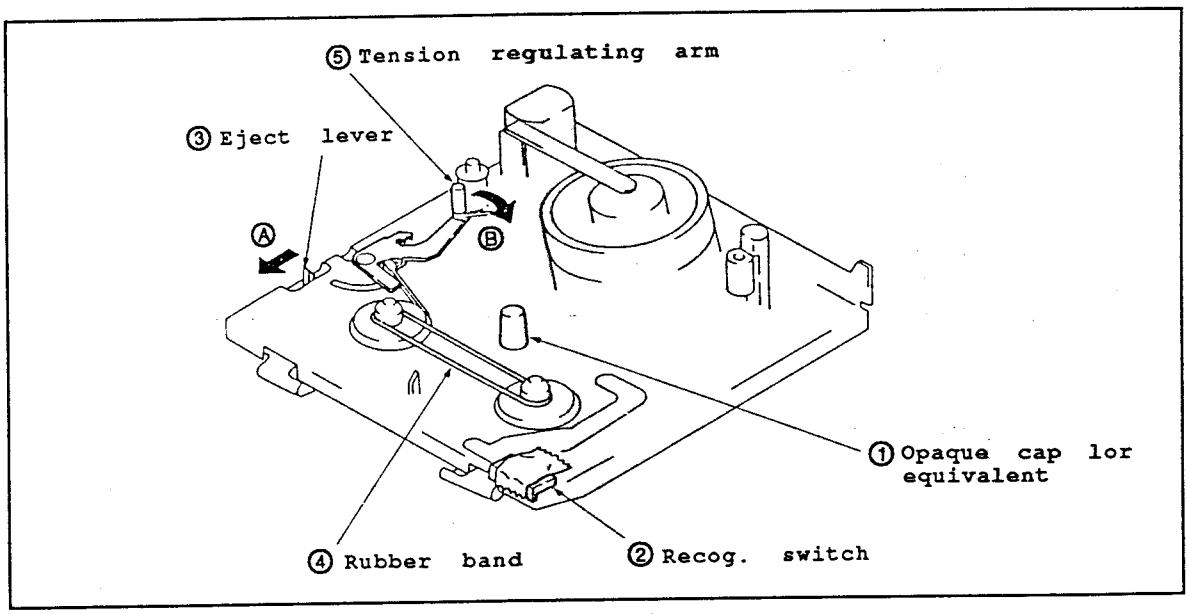


Fig.II-2

1-4 Independent Operation of Mechanism Section

*Note: Perform this operation when the C.B.A.S are removed.

(1) To expose the terminals, remove the tape from the upper part of loading motor. (Fig.II-3)
(2) Supply 3V (approx.) to the terminals of loading motor ① from the constant voltage supplier.
(3) For confirming the mechanical modes, use the output of slide switch ② (mode switch). (Fig.II-4, Table II-1).

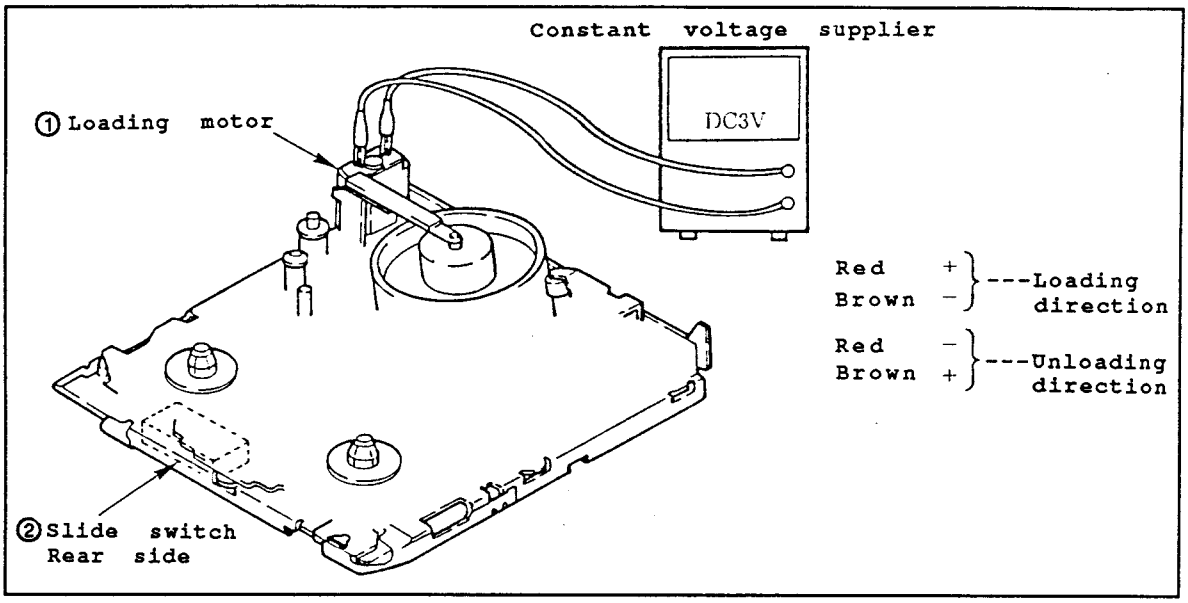


Fig.II-3

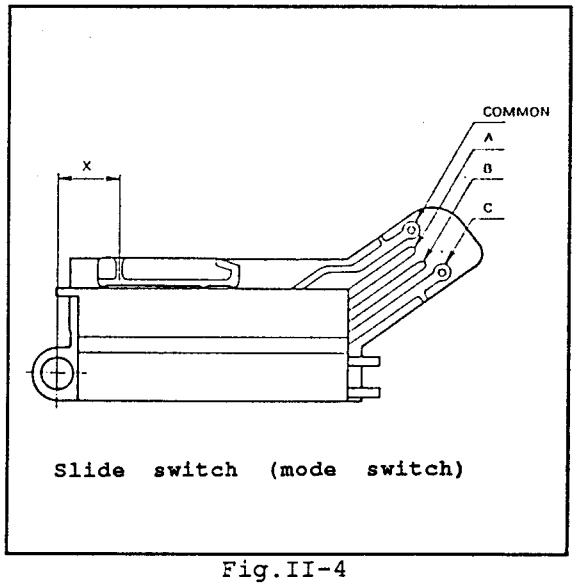


Fig.II-4

Modes	X (mm)	A	B	C
Eject	1.7-2.7	opened	opened	shorted
Blank	2.7-5.7	opened	opened	opened
Load/Unload	5.7-6.7	opened	shorted	shorted
Blank	6.7-8.1	opened	shorted	opened
Stop	8.1-9.1	shorted	shorted	opened
Blank	9.1-12.0	shorted	opened	opened
Play	12.0-13.3	shorted	opened	shorted

Note: "Opened" and "shorted" in the table is versus the COMMON.

Table II-1

2. Periodic Check/Confirmation and Notes for **Each Mechanism**

To maintain the performances of equipment and tape properly, perform the following checks periodically. Also, after repairing,confirm the followings regardless of the length of use hours.

- Cleaning

2-1 Rotary Drum

(1) Clean the rotary drum gently with a thick lens tissue (CY9-4023-003) with ethyl alcohol wetted.
When cleaning, rotate the rotary drum counterclockwise gradually by hand.

*Notes: 1. Do not rotate the motor by using the power source.
2. Do not rotate the drum clockwise.
3. Do not clean the drum except the above procedure.
If the lens tissue with ethyl alcohol soaked is used vertically to head chip, the head chip may be damaged.

2-2 Tape Path

(1) Clean the tape path (No.1-7 guides, Capstan shaft and Pinch roller) by using a lens tissue with ethyl alcohol soaked. (Fig.II-5)

2-3 Driving System (Timing belt, surface of reel table)

(1) Clean the timing belt and the reel table by using a lens tissue with ethyl alcohol soaked.

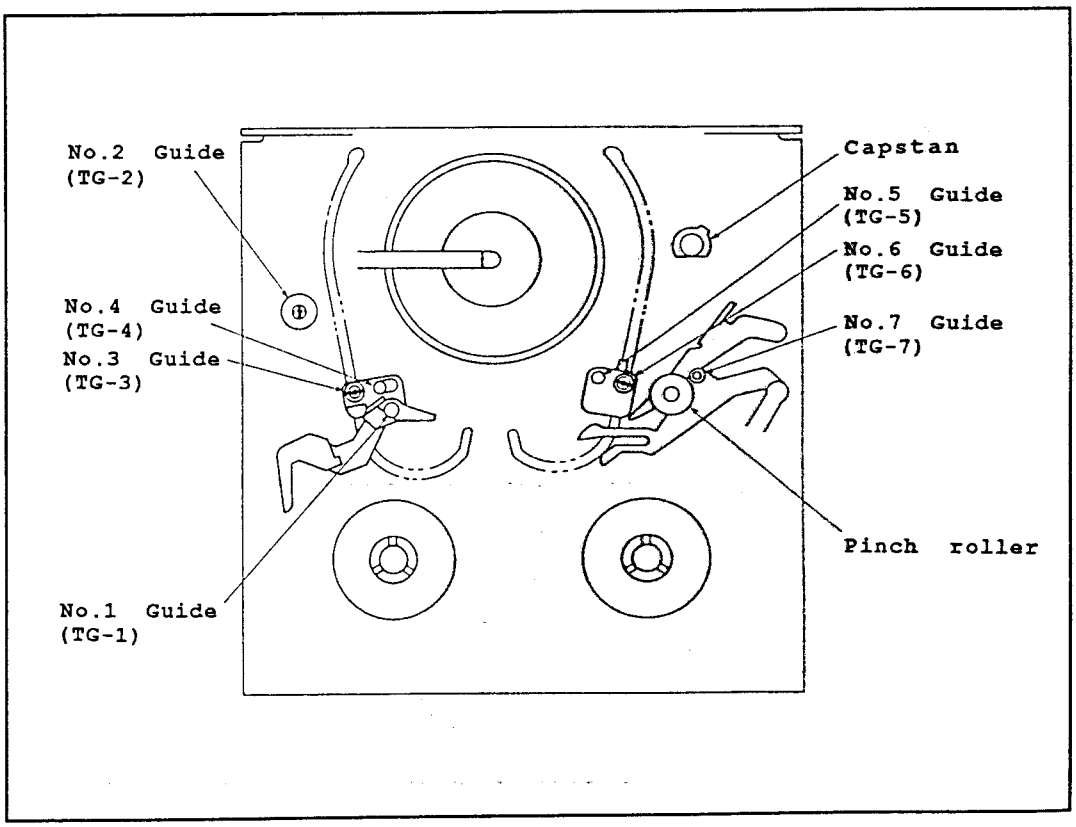


Fig.II-5

2-4 Periodic Check/Confirmation Items

When performing periodical Check/Confirmation, refer to the following items.

Check/Conformation items		Hours of Use (H)										Remarks
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Drum/ Tape Path	Cleaning of tape path surface	○	○	○	○	○	○	○	○	○	○	Be careful for oil
	Cleaning of rotary drum assembly	○	○	○	○	○	○	○	○	○	○	Be careful for oil
Driving Systems	Relay belt	—	☆	—	☆	—	☆	—	☆	—	☆	
	Capstan shaft	—	◎	—	◎	—	◎	—	◎	—	◎	Be absolutely careful not to put oil on the tape path surface.
	Relay pully shaft	—	◎	—	◎	—	◎	—	◎	—	◎	
	Loading motor	—	☆	—	☆	—	☆	—	☆	—	☆	
Confirmation	Abnormal noise	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
	Back tension measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
	FWD.RVS torque measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

Oil and Grease

(1) "One drop of oil" means the amount which sticks to a 2mm diameter rod, as shown in Fig.II-6.
(2) Use oil and grease specified below.
Molyton grease DY9-3009-000
Hydroflud-NT68 Commercially available (DY9-3010-000).
(3) For a shaft receiver, be sure to use the oil without dust particles, etc. If the oil with such substances used, a shaft receiver may be damaged by friction, etc..

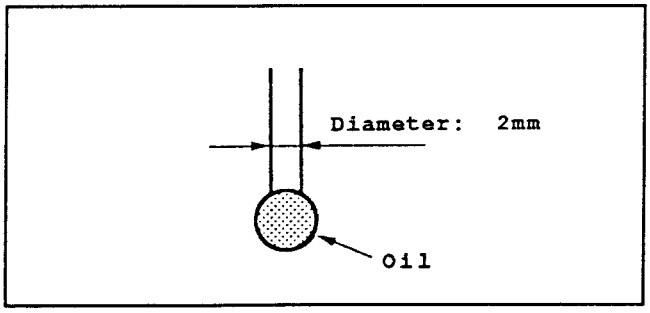


Fig.II-6

3 Disassembling/Adjustment for Mechanical Section

3-1 Roller Assembly

- Disassembling (Fig.II-7)

  (1) To dismount the roller assembly ②, removes a screw ①.

- Reassembling (Fig.II-7)

  (1) Install the roller assembly while aligning the two dowels with the two holes ④ at mechanical chassis.
  (2) Secure the roller assembly ② with a screw ①.

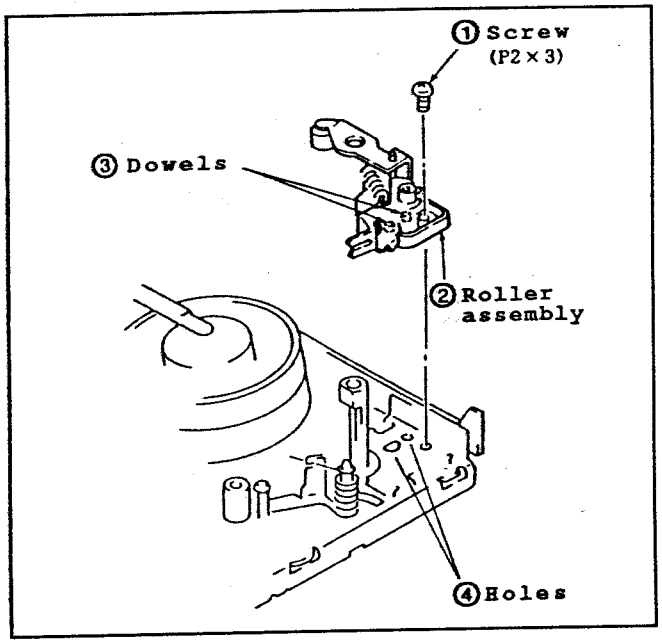


Fig.II-7

3-2 Guide Guard

- Disassembling (Fig.II-8)

  (1) To detach the guide guard, remove a screw ①.

- Reassembling (Fig.II-8)

  (1) Install the guide guard while aligning the dowel ③ with the hole ④.
  (2) Secure the guide guard ② with a screw ①.

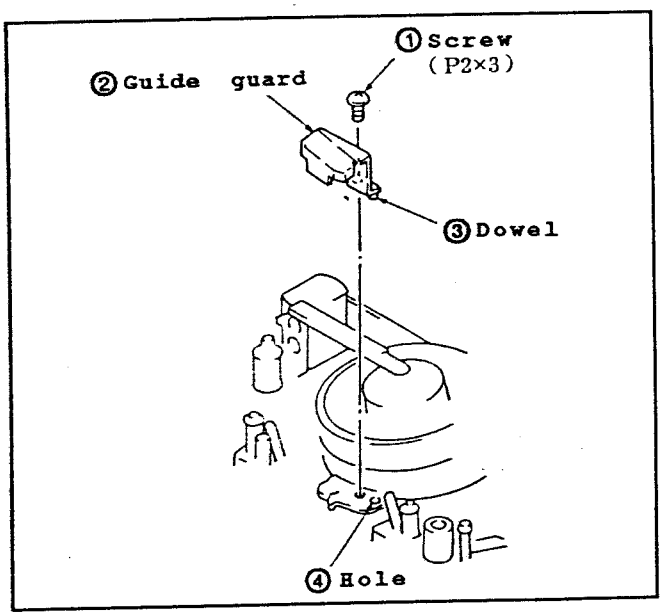


Fig.II-8

3-3 Capstan Motor

- Disassembling (Fig.II-9)

(1) Set the unloading state.
(2) Rotate the stopper ① in direction Ⓐ until it comes to an end.
(3) To take out the capstan motor ③, remove the two set screws ②.

- Reassembling (Fig.II-9)

(1) Align the two dowels ④ with the two holes ⑤ to match the gear section ⑥ with the connecting gear ⑦.
(2) Secure the capstan motor ③ with the two set screws ②.
(3) Rotate the stopper ① in direction of Ⓑ until it comes to an end.

*Notes: 1. Do not match the gear section ⑥ and the connecting gear ⑦ forcibly to prevent the cam grooves damaging.
2. Fit the capstan motor ③ and the chassis without space.
3. Do not touch the capstan motor shaft, the rotor section and the oil seals.

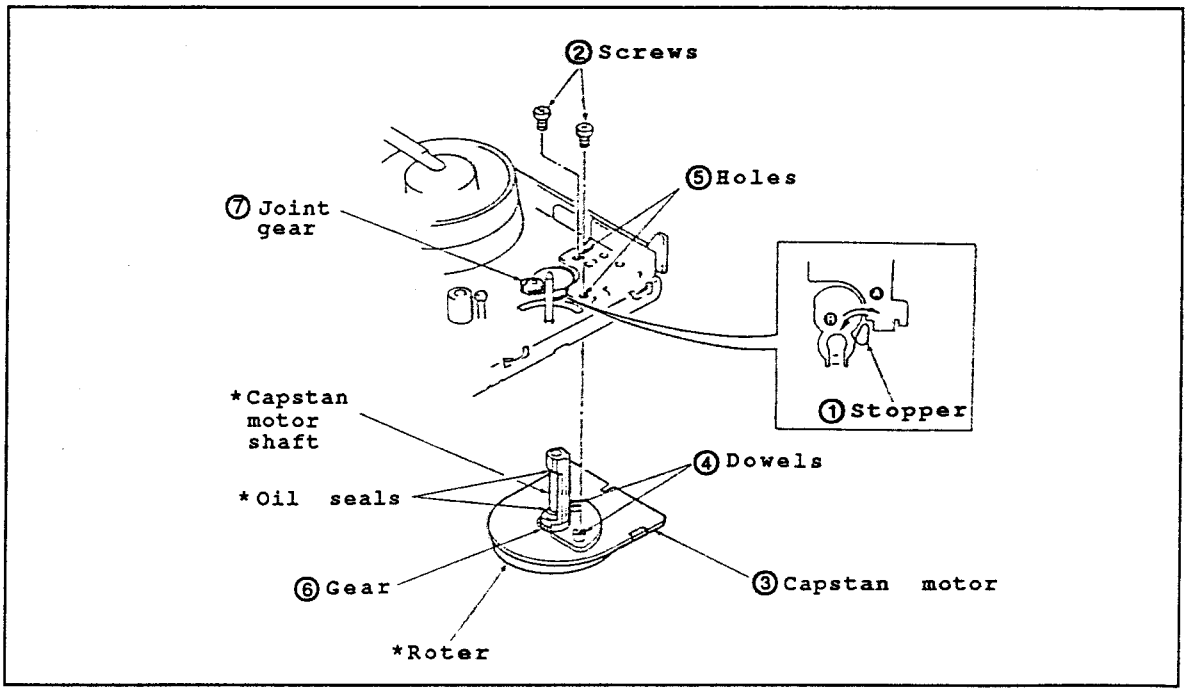


Fig.II-9

3-4 S Brake, T Brake

- Disassembling (Fig.II-10)

(1) Remove the spring ①.
(2) To take out the T brake ③, remove the shaft pin ②.
(3) To take out the S brake ⑤, remove the shaft pin ④.

*Note: If the claw part of shaft pin ② and ④ damaged, replace them.

- Reassembling (Fig.II-10)

(1) Install the S brake ⑤ while inserting the gear ⑥ into the notch ⑦.
(2) Attach the shaft pin ④.
(3) To install T brake ③, put the shaft ⑧ of T brake ③ into the S reel side comparing the brake releasing arm ⑨. At this time, part Ⓐ must be at the drum side comparing part Ⓑ.
(4) Attach the shaft pin ②.
(5) Insert the spring ① under the claw ⑪ of shaft ⑩.
Hook the spring ① on the claws ⑫, respectively.

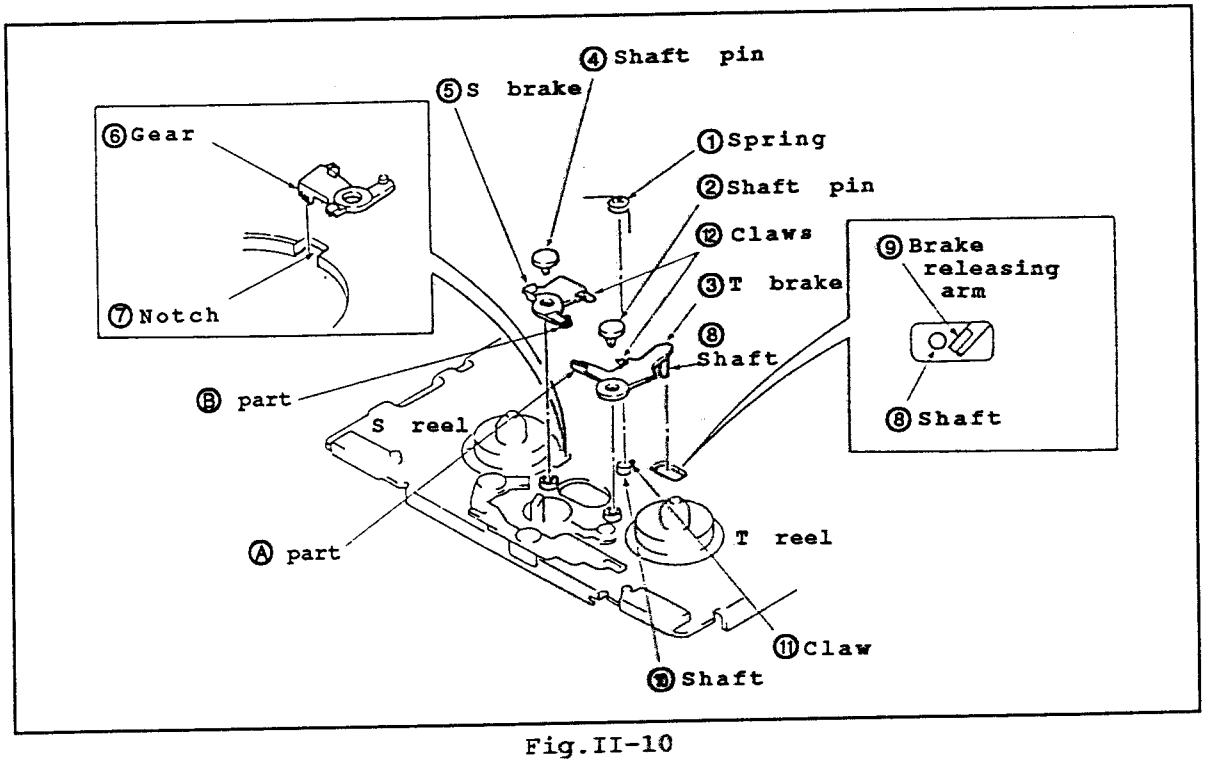


Fig.II-10

3-5 LB Brake, LB Lever

• Disassembling (Fig.II-10)

(1) To take off the TL plate ②, remove the screw ①.
(2) To take off the LB brake ④, remove the shaft pin ③.
(3) To take off the LB lever ⑥, remove the shaft pin ⑤.

*Note: If the claw part of shaft pin ③ and ⑤ damaged, replace them.

• Reassembling (Fig.II-11)

(1) Assemble the LB lever ⑥ while inserting the LB gear pin ⑦ to the hole of LB lever ⑥. Then, secure it with the shaft pin ⑤.
(2) Assemble the LB brake ④ while inserting the pin ⑧ to the notch ⑨ of LB lever ⑥ and the gear ⑩ to the notch ⑪.
(3) Install the shaft pin ③.
(4) Assemble TL plate ② while aligning the dowel ⑫ and the hole ⑬. Then, secure it with the screw ①.

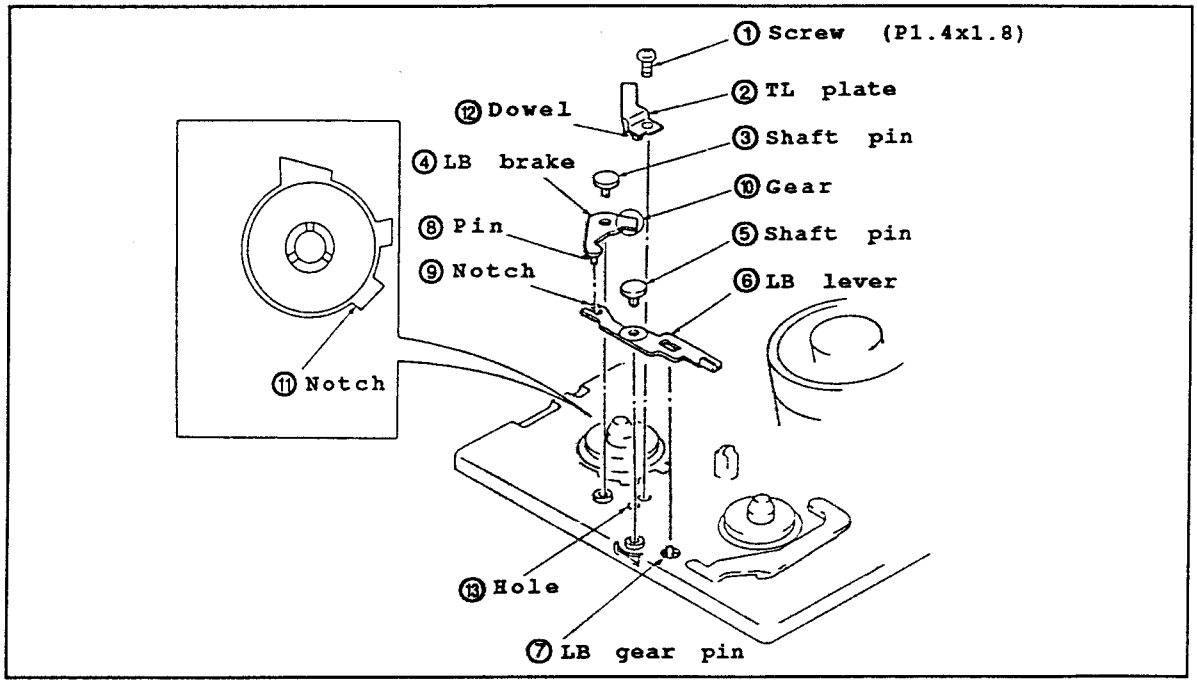


Fig.II-11

3-6 LB Releasing Arm

- Disassembling (Fig.II-12)

  (1) Take off the LB releasing arm ② while pushing the claw ① in the arrow direction.

- Reassembling (Fig.II-12)

  (1) Install the LB releasing arm ② to the shaft ③ while inserting ⓐ, ⓑ, ⓒ and ⓓ to the holes ④, respectively.
  Then, secure it by hooking the claw ①.

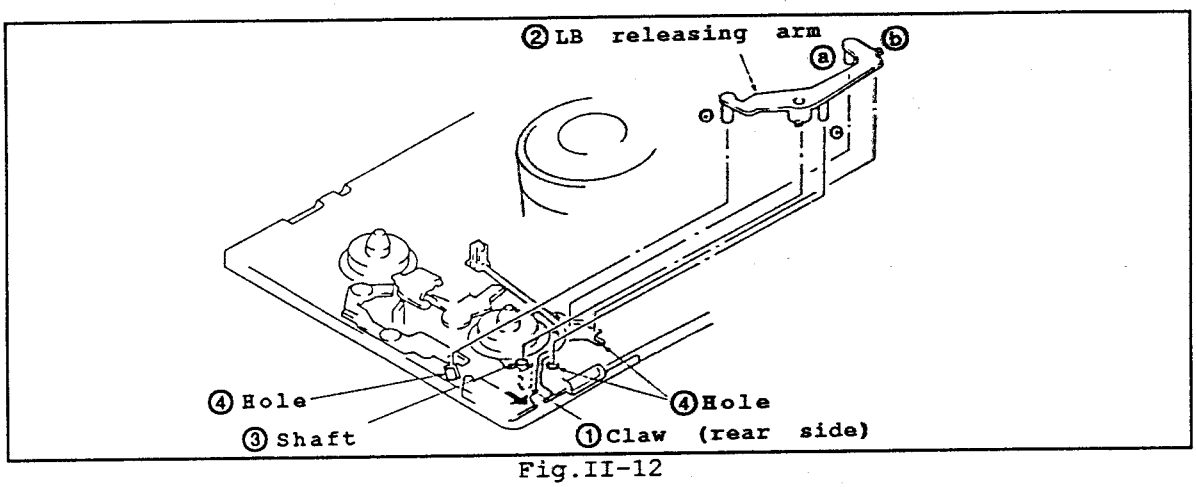


Fig.II-12

3-7 RK Stopper, RK Stopper Arm

- Disassembling (Fig.II-13)

  (1) Remove the screw ①.
  (2) To take off the RK stopper arm ③, unhook the claw ② of chassis.
  (3) Take off the RK stopper ④.

- Reassembling (Fig.II-13)

  (1) Assemble the RK stopper ④ onto the shaft ⑤.
  (2) Assemble RK stopper arm ③ onto the shaft ⑥ while inserting the pin ⑩ to the hole ⑪.
  Then, secure it by hooking the claw ② to the hole ⑦.
  (3) Install the spring ① to the shaft ⑤.
  Then, hook it to the claws ⑧ and ⑨, respectively.

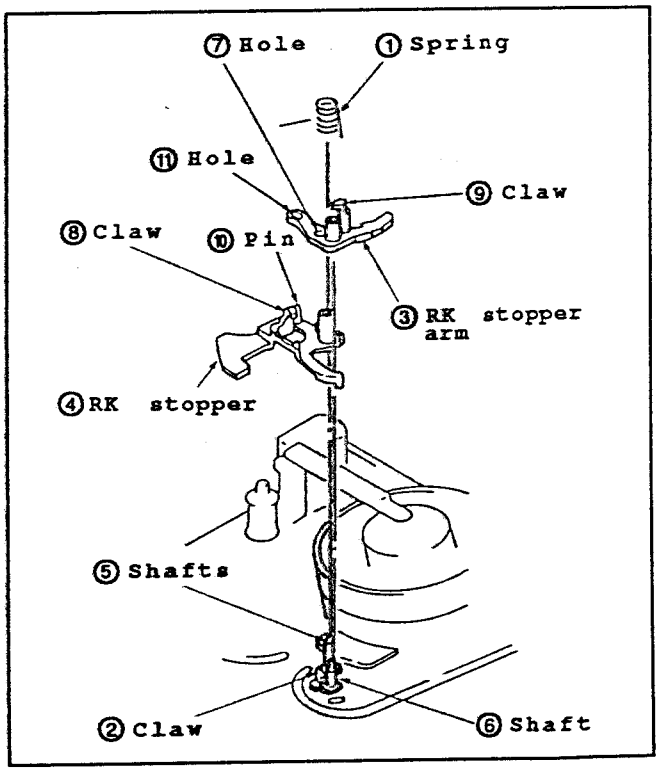


Fig.II-13

3-8 Pinch Arm, TG-7 Arm

• Disassembling (Fig.II-14)

(1) Set the unloading state.
(2) To take off the pinch arm ②, remove the washer ①.
(3) To detach the TG-7 plate spring ⑤, bend the claw ④ of hole ③ by using a thin screwdriver or equivalent.
(4) Detach the TG-7 arm.

• Reassembling (Fig.II-14)

(1) Apply the grease on the inside and the bottom surface of the hole ⑦.
(2) Insert the shaft ⑧ of TG-7 arm ⑥ to the hole ⑦.
(3) Apply the grease on the shadowed area ⓐ. (Fig.A)
(4) Insert the TG-7 plate spring ⑤ to the hole ③.
Then, secure it by hooking the claw ④.
(5) Apply the 1/2 drop of oil to the shaft ⑨. (Fig.B)
(6) Insert the pinch arm ② to the shaft ⑨.
Then, assemble while inserting the pinch sub-arm's cut-up part into the ⓑ part.
(7) Secure it with the washer ①.

* Notes: 1. Do not apply the grease on the screw ⑪ of TG-7 arm ⑥. (Fig.A)
2. Be careful for the TG-7 guide and the rubber part when inserting.
3. After reassembled, be sure to perform the tape path adjustment.

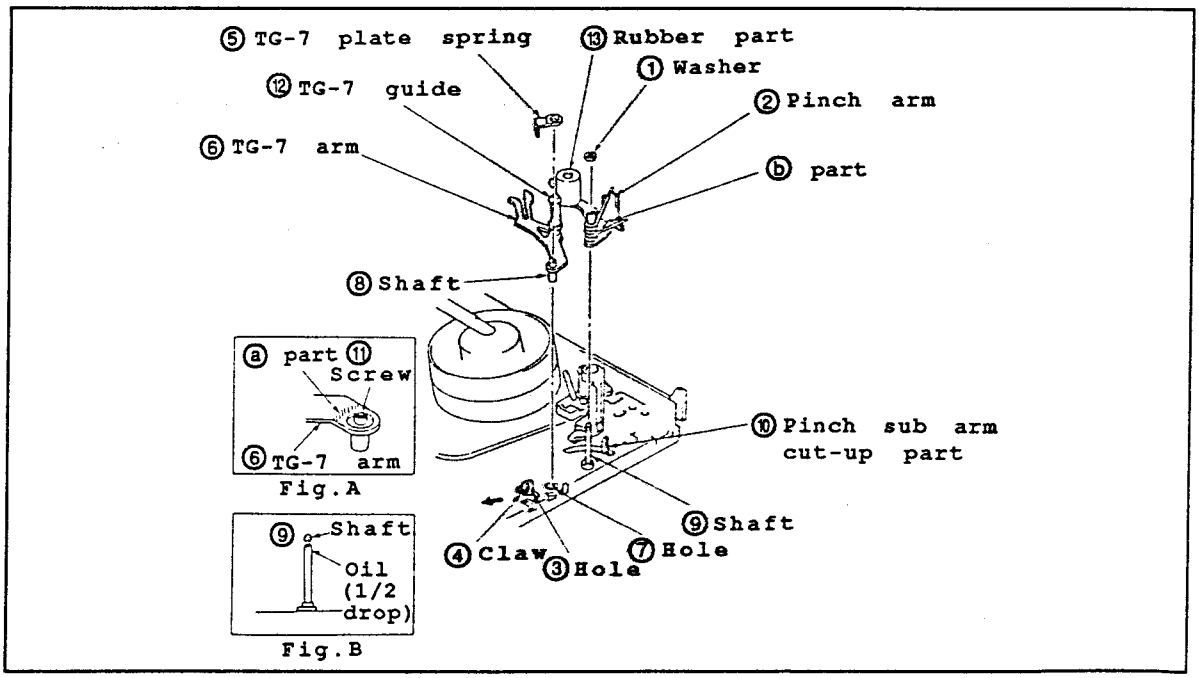


Fig.II-14

3-9 TG-2

- Disassembling (Fig.II-15)

(1) Take out the TG-2 upper flange ①.
(2) Take out the TG-2 roller ②, TG-2 sleeve ③, TG-2 lower flange ④ and the coil spring ⑤.

- Reassembling (Fig.II-15)

(1) Install the coil spring ⑤, TG-2 lower flange ④, TG-2 sleeve ③ and TG-2 roller ② to the shaft.
(2) Secure the TG-2 upper flange ① to the shaft by turning it four to 6 times.

- Presetting (Fig.II-16)

(1) Turn the TG-2 upper flange ① to adjust the height between the mechanical chassis surface and the TG-2 upper flange to 18.6mm.

*Note: After presetting, perform the tape path adjustment.

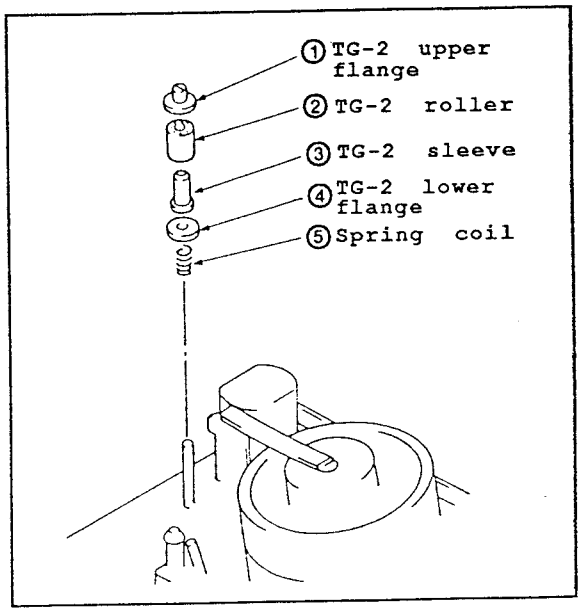


Fig.II-15

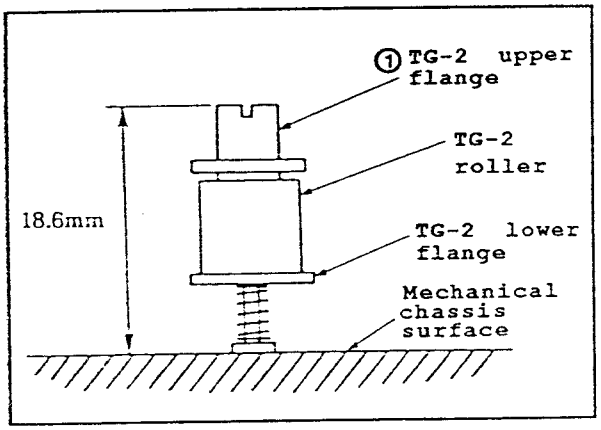


Fig.II-16

3-10 S Reel Table, T Reel Table

• Disassembling (Fig.II-17)

(1) In the same procedures in "3-4", dismount the S and T brake.
(2) In the same procedures in "3-5", detach the TL plate.
(3) In the same procedures in "3-11", take off the tension regulator band.
(4) Dismount the S reel table ①.
(5) Turn the stopper ② in the direction of Ⓐ by 90° approximately.
(6) While shifting the LB releasing arm ③ in the direction of Ⓑ, dismount the T reel table.

• Reassembling (Fig.II-17)

*Caution: When mounting S and T reel tables, be careful not to drop the oil onto the reflection plate at the rear side. If the oil dropped, dust particles may put on and it makes the counter inaccurate.

(1) Apply the 1/2 drop of oil to the shaft ⑤. (Fig.A)
(2) Rotate RK gear ⑥ to the direction of Ⓒ.
Rotate the TS brake ⑦ to the direction of Ⓓ.
(3) While shifting the LB releasing arm ③ to the direction of Ⓑ, mount the T reel table ④ to the shaft ⑤.
Then, turn the stopper ② to the direction of Ⓕ until it comes to an end.
(4) Apply the 1/2 drop of oil to the shaft ⑧. (Fig.B)
(5) Rotate the RK gear ⑥ to the direction of Ⓕ.
Rotate the UL brake ⑨ to the direction of Ⓖ.
Rotate the LB brake ⑩ to the direction of Ⓗ.
(6) Mount the S reel table to the shaft ⑧.
(7) In the same procedures in "3-11", hook up the tension regulator band.
(8) In the same procedures in "3-5", attach the TL plate.
(9) In the same procedures in "3-4", mount the S brake and T brake.

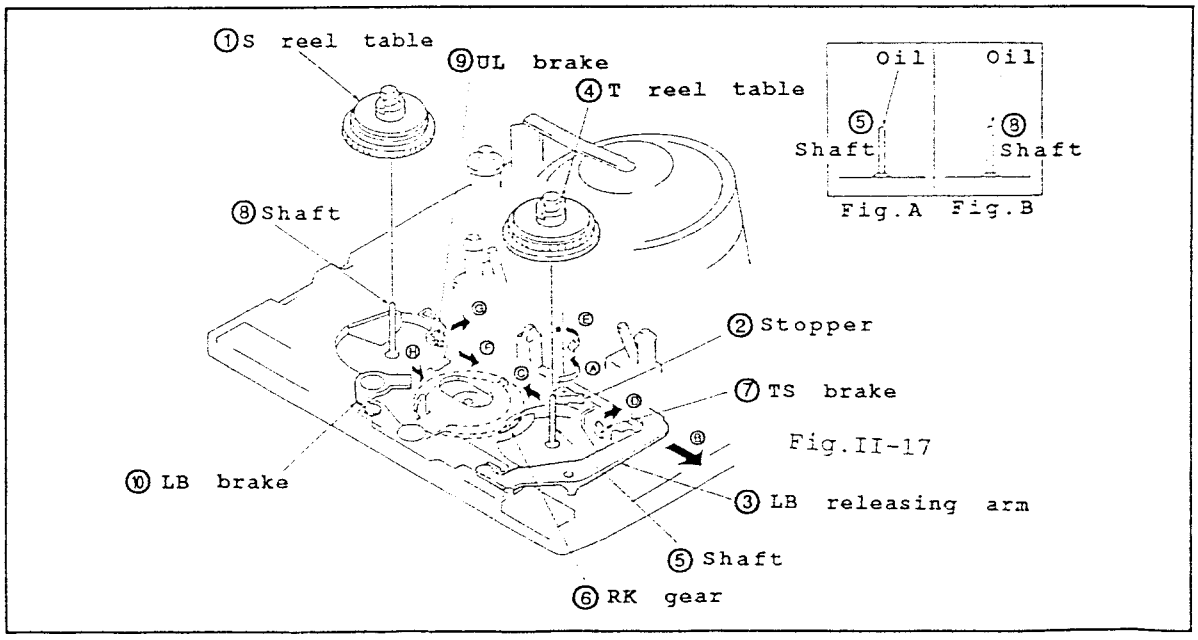


Fig.II-17

3-11 Tension Regulator Band/Arm

• Disassembling (Fig.II-18)

(1) In the same procedures in "3-5", detach the TL plate.
(2) Remove the screw ①.
(3) Take off the tension regulator band from the shaft ③ of tension regulator arm ② by using a thin screwdriver or equivalent.
(4) Remove the spring coil ⑤.
(5) Remove the washer ⑥ from the rear side of mechanical chassis. Then, detach the tension regulator arm ②.
(6) To detach the adjust arm ⑧, unhook the claw ⑦.

*Note: When detaching the tension regulator band ④, be careful not to twist or fold it. Also, when detaching it, do not touch the felt side ⑨ and drop the oil.

• Reassembling (Fig.II-18)

(1) Mesh the adjust arm ⑧ with the position indicated in the Fig. A, then, hook the claw ⑦.
(2) Apply the 1/2 drop of oil to the hole ⑩.
(3) Attach the tension regulator arm ② to the slot ⑪ while inserting ⓐ part inside of switch lever a'ssy. (Ⓐ indicated by an arrow.) (Fig.B)
(4) While pressing the tension regulator arm ② from the front side of chassis, secure it with a washer ⑥ from the rear side.
(5) Hook the spring coil ⑤ to the adjust arm ⑧ and the tension regulator arm ②, respectively. The direction of coil is as indicated in the Fig.
(6) Attach the tension regulator band ④ to the shaft ③ of the tension regulator arm ② while fitting the felt side ⑨ onto the shadow area of S reel table ⑫.
(7) Assemble the tension regulator plate ⑬ of the tension regulator band ④ while aligning it with the dowel ⑭ of chassis. Then, secure it with the screw ①.
(8) In the same procedures in "3-5", attach the TL plate.
(9) In the same procedures in "3-21", perform the tension regulator adjustment.
(10) In the same procedures in "3-22", perform the back tension adjustment.

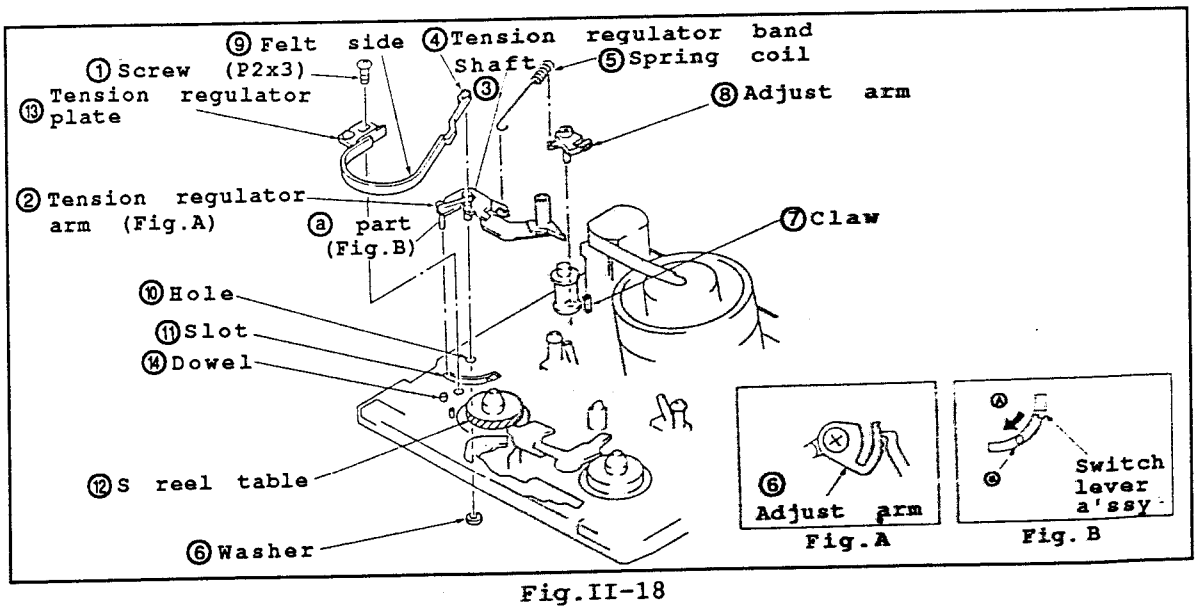


Fig.II-18

3-12 Drum Unit, Dew Sensor

- Disassembling (Fig.II-19)

(1) Set unloading state.
(2) Unplug the flexible connector ① and the connectors ②.
(3) In the same procedures in "3-2", detach the guide guard.
(4) To detach the earth terminal ④, remove the screw ③.
(5) To dismount the drum ⑥ from the chassis, remove the three setscrews ⑤.
(6) Disconnect the connector ⑩.
(7) To detach the dew sensor ⑧, remove the screw ⑦.

- Reassembling (Fig.II-19)

(1) Mesh the ⓐ part of dew sensor ⑧ with the notch ⑪. Then, secure them with the screw ⑦.
(2) Attach the connector ⑩.
(3) Put the harness ⑮ of dew sensor ⑧ under the claw ⑯. (Fig.A)
(4) Insert the connectors ② and the flexible connector ① into the chassis' hole ⑫.
Then, mount the drum while aligning the dowels ⑬, and secure it with the screws ⑤.
(5) While aligning the earth terminal ② with the chassis' two dowels ⑭, secure it with the screw ③.
(6) In the same procedures in "3-2", attach the guide guard.
(7) Attach two connectors ② and the flexible connector ① to the C.B.A..

*Notes: 1. Be careful not to flaw the head chip ⑨ and the tape path surface of drum ⑥.
2. After reassembling, perform the tape path adjustment.

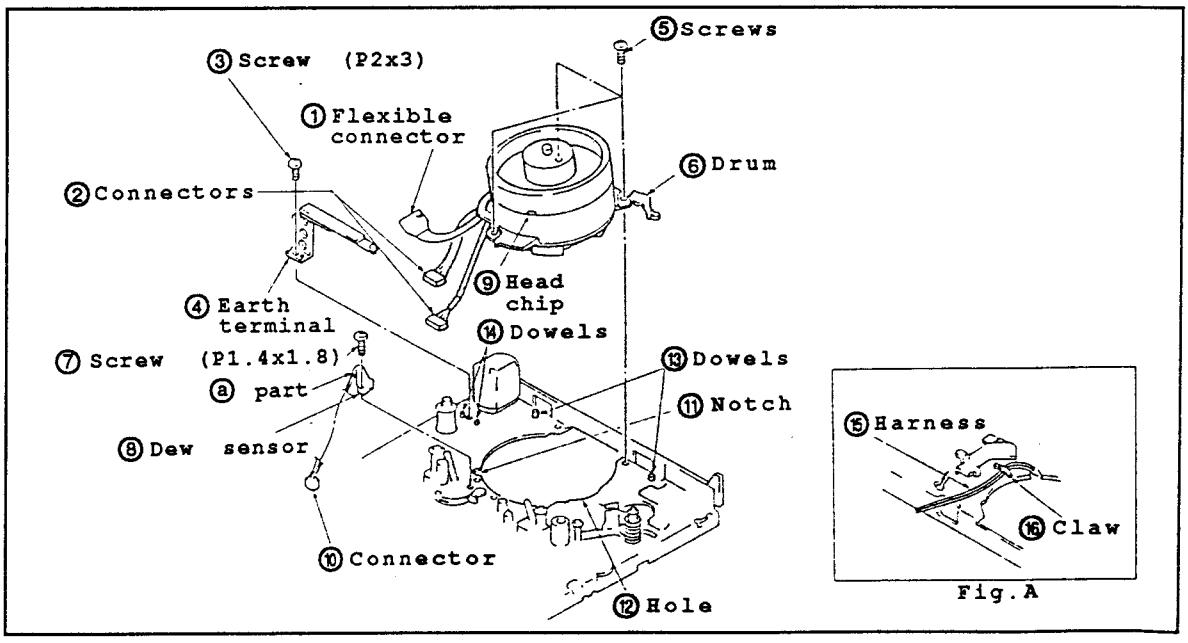


Fig.II-19

3-13 Eject Lever, Switch Lever, Pinch Sub Arm

• Disassembling (Fig.II-20)

(1) Set unloading state.
(2) In the same procedures in "3-3", dismount the capstan motor.
(3) To dismount the eject lever ②, unhook the claw ①.
(4) To detach the switch lever ④, remove the washer ③.
(5) Remove the spring ⑤.
(6) To detach the pinch sub arm ⑦, remove the washer ⑥.

• Reassembling (Fig.II-20)

(1) Apply the grease onto the shaft ⑧. (Fig.A)
(2) Assemble the pinch sub arm ⑦ while inserting the ⓐ part into the slot ⑨.
(3) Secure it with the washer ⑥.
(4) Hook the ⓑ part of spring ⑤ between the claw ⑫ and the chassis side while hooking ⓒ part to the claw ⑫.
(5) Apply 1/2 drop of oil to the shaft ⑬. (Fig.B)
(6) Assemble the switch lever ④ to the shaft ⑬ while aligning the groove ⑭ with the projection ⑮ of mode switch. At this time, insert the pin ⑯ to the outside groove ⑰ of drive gear (left) ⑰.
(7) Secure it with a washer ③.
(8) Attach the eject lever ② and hook the claw ①.
(9) In the same procedures in "3-3", mount the capstan motor.

*Note: When installing the switch lever ④ to the shaft ⑬, set the pin ⑱ of tension regulator arm to the inside of switch lever ④. (within the extent of Ⓐ indicated by an arrow.)

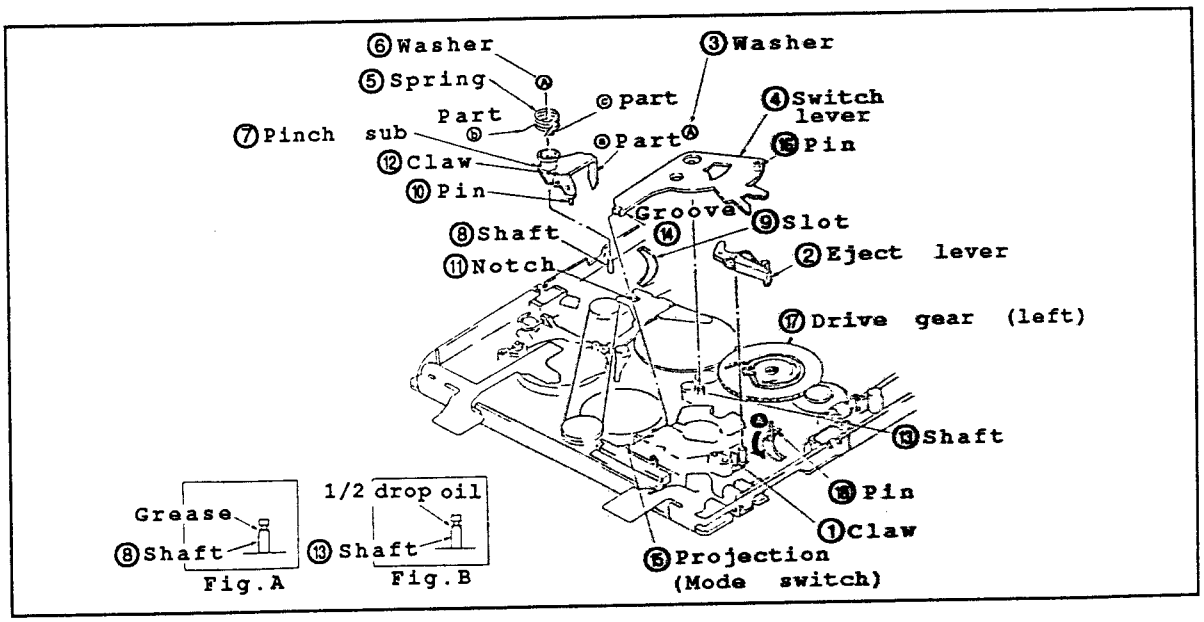


Fig.II-20

3-14 Timing Belt (L), RC Gear, Loading Lever, Timing Belt(S), Joint Gear

• Disassembling (Fig.II-21)

(1) Set unloading state
(2) In the same procedures in "3-3", dismount the capstan motor.
(3) In the same procedures in "3-13", detach the pinch sub arm.
(4) Remove the washer ①. Then dismount the RC gear ② (with the timing belt (L) ③ hooked) from the shaft ④.
(5) Remove the washer ⑥. Then, detach the loading lever ⑧ while pushing the claw ⑦ toward the direction Ⓐ.
(6) Turn the stopper ⑨ toward the direction Ⓑ by 90°.
(7) Detach the joint gear ⑪ (with the timing belt(S) ⑩ hooked) from the shaft ⑯.
(8) Separate the timing belt(S) ⑩ from the relay pully ⑤.

*Note: When dismounting the gear ⑪, do not touch the flange ⓑ part. (Fig.D)

• Reassembling (Fig.II-21)

(1) Apply 1/2 drop of oil to the shaft ⑯. (Fig.F)
(2) Hook the timing belt(S) ⑩ to the joint gear ⑪, and then to the gear ⓓ of relay pully ⑤ (Fig.E).
(3) Attach the joint gear ⑪ to the shaft ⑯ with the timing belt(S) ⑩ attached.
(4) Turn the stopper ⑨ toward the ⓒ direction until it comes to an end.
(5) Apply 1/2 drop of oil to the shaft ⑫. (Fig.A)
(6) Insert the loading lever ⑧ into the shaft ⑫. Then, match the ⓐ part with the claw ⑦ and insert the pin ⑬ into the groove of drive gear (right) ⑭.
(7) Secure the washer ⑥.
(8) Hook the timing belt(L) ③ to the gear as indicated in the Fig.B, and to the gear Ⓒ of the relay pully ⑤. (Fig.E)
(9) Mount the RC gear ② to the shaft ④ (with the timing belt(L) ③ attached). Then, mesh it with the RK gear ⑮.
(10) Secure the washer ①.
(11) Apply the grease to the position of loading lever ⑧ as indicated in Fig.C.
(12) In the same procedures "3-14" and "3-3", assemble the pinch sub arm and the capstan motor.

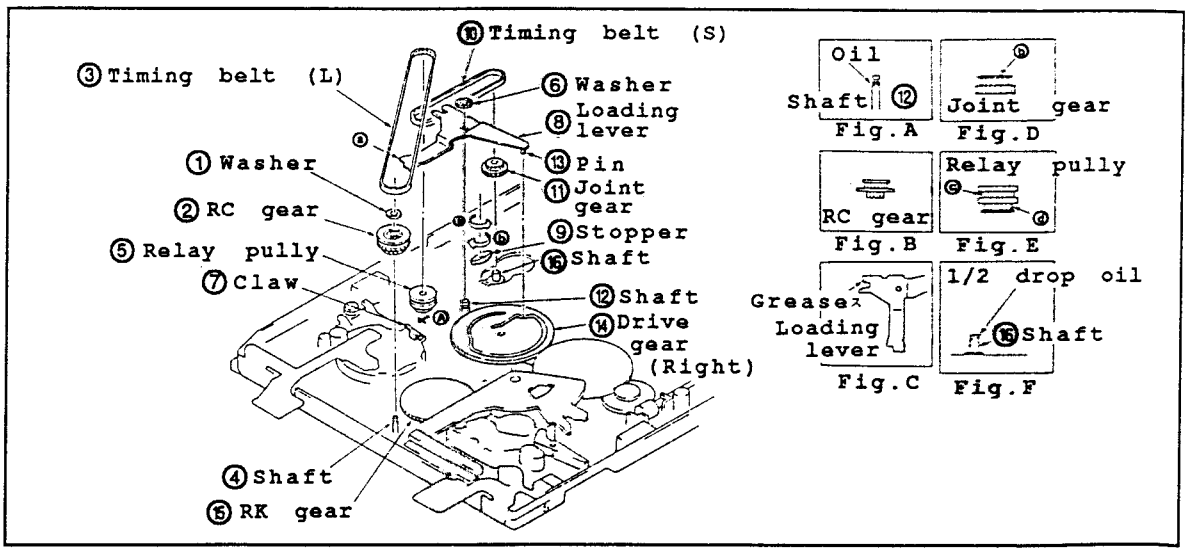


Fig.II-21

3-15 Relay Pully, TS Brake, LB Gear, RK Gear

- Disassembling (Fig.II-22)

(1) Set unloading state.
(2) In the same procedures in "3-3", dismount the capstan motor.
(3) In the same procedures in "3-13", detach the switch lever.
(4) In the same procedures in "3-14", detach the timing belt(L), the RC gear, the loading lever, the timing belt (S) and the joint gear.
(5) To take off the relay pully ②, remove the washer ①.
(6) To detach the TS brake ④, unhook the claw ③.
(7) Remove the spring ⑤.
(8) To detach the LB gear ⑦, remove the washer ⑥.
(9) Detach the RK gear ⑧.

*Note: When taking off the relay pully ②, do not touch the flange part ⓐ. (Fig.C)

- Reassembling (Fig.II-22)

(1) Apply the 1/2 drop of oil to the shaft ⑨. (Fig.A)
(2) Install the RK gear ⑧ to the shaft ⑨ longitudinally.
(3) Apply the 1/2 drop of oil to the shaft ⑩. (Fig.B)
(4) Install the LB gear ⑦ to the shaft ⑩. Then secure it with the washer ⑥.
(5) Put the spring into the shaft ⑪. Then, hook it to the notch ⑫, and cut-up part ⑬.
(6) Assemble the TS brake ④, and hook the claw ③.
(7) Apply the 1/2 drop of oil to the shaft ⑭. (Fig.D)
(8) Attach the relay pully ② to the shaft ⑭, and secure it with the washer ①.
(9) In the same procedures in "3-14", attach the timing belt(L), the RC gear, the loading lever, the timing belt(S) and the joint gear.
(10) In the same procedures in "3-13" and "3-3", install the switch lever and the capstan motor.

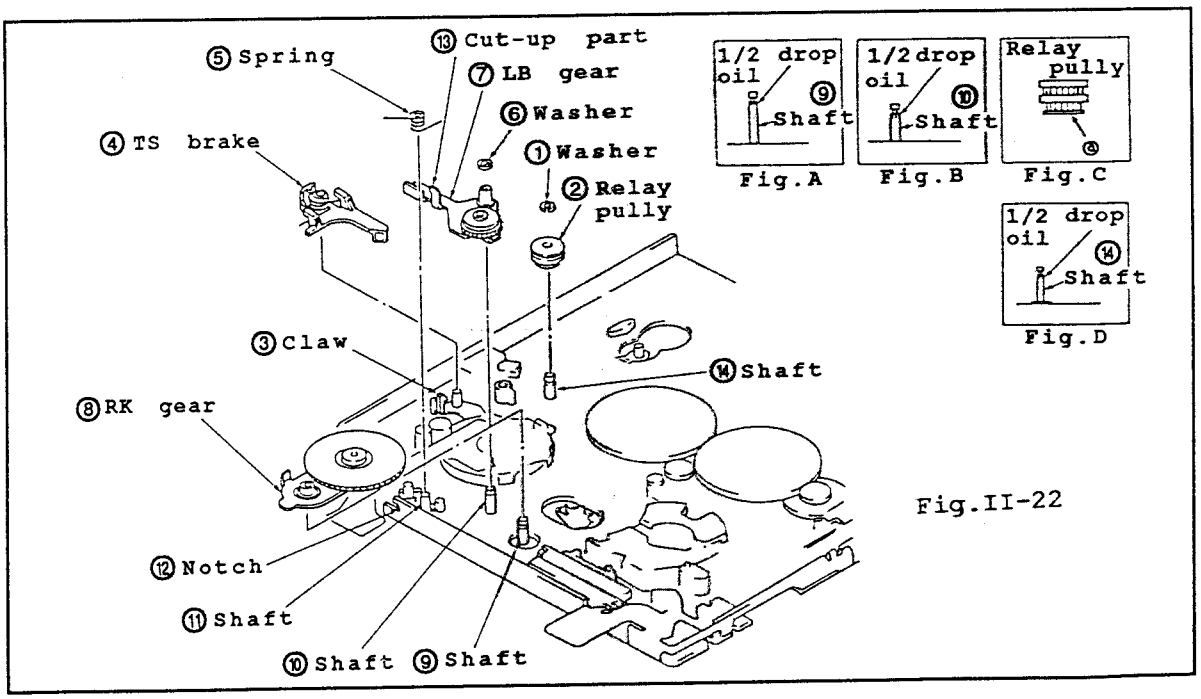


Fig.II-22

Fig.II-22

3-16 UL Gear, UL Brake, UL Arm, LB Plate spring

- Disassembling (Fig.II-23)

(1) In the same procedure in "3-13", detach the switch lever.
(2) To take off the UL gear ②, remove the washer ①.
(3) Detach the UL arm ③, the washer ④ and the LB plate spring ⑤.
(4) Take off the UL brake ⑥.

- Reassembling (Fig.II-23)

(1) Install the UL brake ⑥.
(2) Apply the 1/2 drop of oil to the shaft ⑦. (Fig. A)
(3) As shown in the Fig.B, attach the LB plate spring ⑤ to the shaft ⑦. Then, attach the washer ④.
(4) While matching the projection ⑧ with the groove ⑨ of UL brake ⑥, install UL arm ③ to the shaft ⑦.
(5) Attach the UL gear ② to the shaft ⑦. Then, mesh it with drive gear (left) ⑩.
(6) Secure it with the washer ①.
(7) In the same procedures in "3-13", install the switch lever.

*Note: To prevent the LB plate spring ⑤ damaging, do not secure the washer ① forcibly.

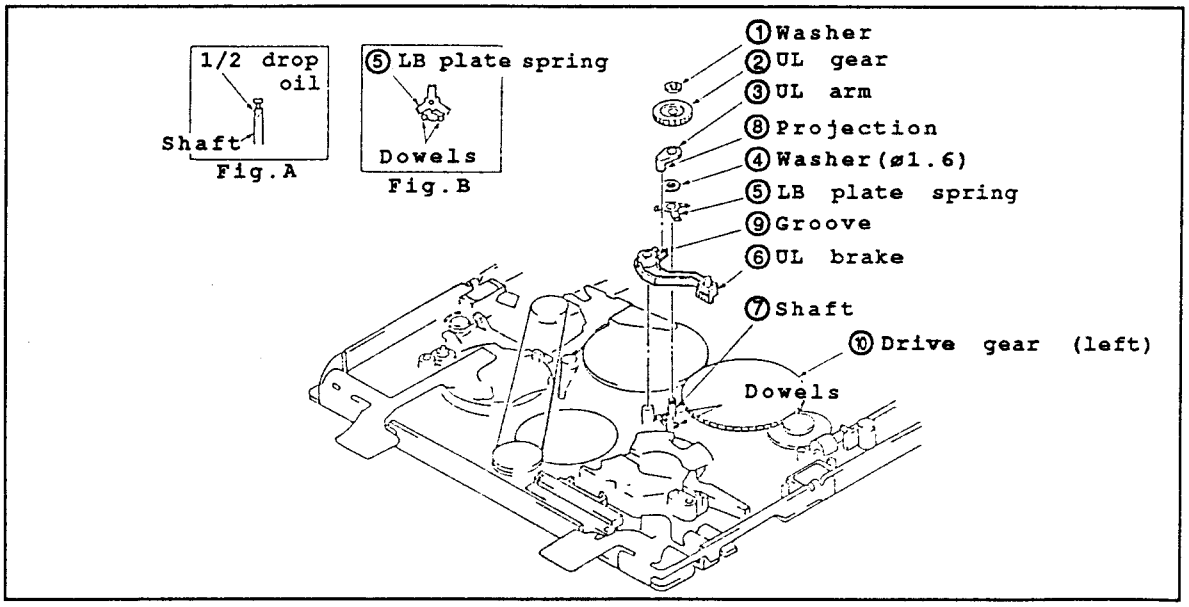


Fig.II-23

3-17 Coaster (Right), Drive Gear (Right)

• Disassembling (Fig.II-24)

(1) In the same procedures "3-3" and "3-12", dismount the capstan motor and the drum unit.
(2) In the same procedures in "3-14", take off the loading lever.
(3) Set STOP mode.
(4) To take off the coaster plate spring ② and the coaster (Right) ③, remove the screw ①.
(5) To detach the plate TT ⑤, remove the two screws ④.
(6) To dismount the drive gear (Right) ⑧, remove the washer ⑥ (ø1.5).

• Reassembling (Fig.II-24)

*Caution: Do not turn the tilt adjusting screw Ⓒ of coaster (Right). (Repair parts have been already adjusted.)

(1) Apply the grease to the indicated positions of chassis as shown in Fig.A.
(2) Apply the 1/2 drop of oil to the shaft ⑧. (Fig.F)
(3) Apply the grease onto the pin ⑨, the shaft ⑩ and the dowel ⑮ of coaster (Right) ③.
(4) Assemble the pin ⑨ and the shaft ⑩ aligning the slot ⑪ of chassis.
(5) Put the brake releasing arm ⑫ to the arrowed direction Ⓐ.
(6) Install the drive gear (Right) ⑦ to the shaft ⑧. Then. mesh it with the drive gear (Left) ⑬ while aligning each phases as shown in Fig.B.
(7) Align ⓐ with ⓑ, the hole ⑭ with the pin ⑨ of coaster (Right) ③, respectively.
(8) Secure the washer ⑥ (ø1.5).
(9) Assemble the coaster plate spring ② while aligning the shaft ⑩ (coaster ③) with the pin ⑨. Then, secure it with the screw ①. (Torque: 500g/cm approx).
(10) Assemble the plate TT ⑤ aligning with the dowel ⑮. Then, secure it with the two screws ④ in numerical order.
(11) Apply the grease to the positions indicated in the Fig.C and E.
(12) In the same procedures in "3-14", install the loading lever.
(13) In the same procedures in "3-12" and "3-3", mount the drum unit and the capstan motor.

*Note: After reassembling, perform the tape path adjustment.

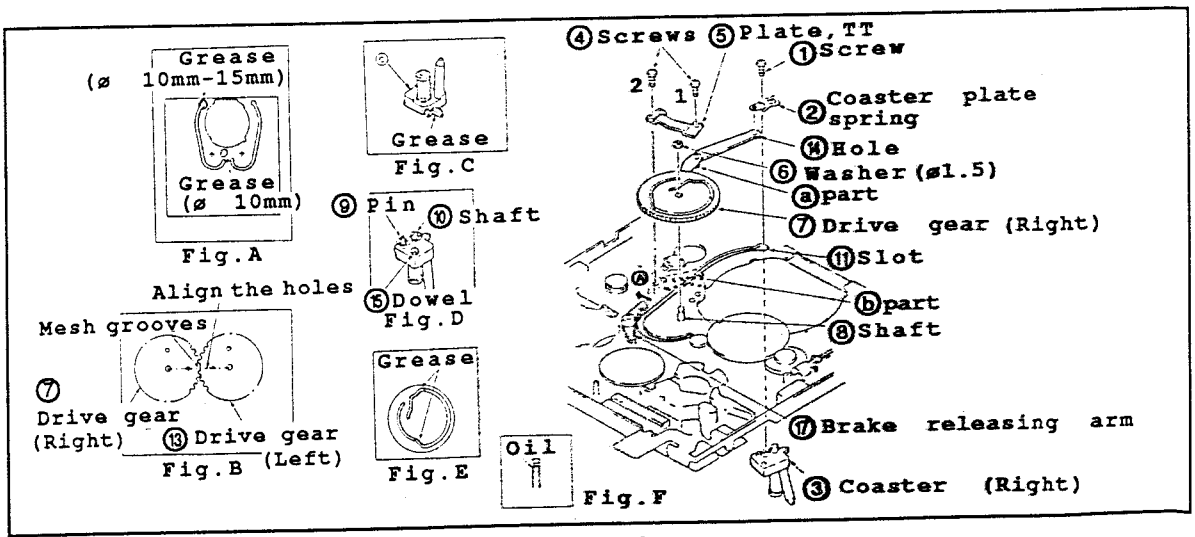


Fig.II-24

3-18 Coaster (Left), Drive Gear (Left)

• Disassembling (Fig.II-25)

(1) In the same procedures in "3-3" and "3-12", dismount the capstan motor and the drum unit.
(2) In the same procedures in "3-13" and "3-14", detach the switch lever, and the loading lever.
(3) In the same procedures in "3-17", detach the coaster (Right) and the drive gear (Right).
(4) To take off the coaster plate spring ② and the coaster (left) ③, remove the screw ①.
(5) To detach the plate SS ⑤, remove the two set screws ④.
(6) To take off the drive gear (Left) ⑦, remove the washer ⑥ (ø1.5).

• Reassembling (Fig.II-25)

(1) Apply the grease onto the indicated positions of chassis in the Fig.A.
(2) Apply the 1/2 drop of oil onto the shaft ⑧. (Fig.E)
(3) Apply the grease onto the pin ⑨, the shaft ⑩ and the dowel ⑯ of coaster (Left) ③.(Fig.B)
(4) Assemble the pin ⑨ and the shaft ⑩ aligning the slot ⑪.
(5) Insert the driver gear (Left) ⑦ into the shaft ⑧ while meshing with the wheel gear ⑫ and the UL gear ⑬.
(6) Align ⓐ part with the slot ⑪, and the hole ⑭ with the pin ⑨ of coaster (Left) ③.
(7) Secure it with the washer ⑥ (ø1.5).
(8) Install the coaster plate spring ② while aligning the shaft ⑩ and the pin ⑨ of coaster (Left) ③. Then, secure it with the screw ①. (Torque: 500g/cm,approx)
(9) Attach the plate SS ⑤ while aligning with the dowel ⑮. Then, secure it the two screws ④ in numerical order.
(10) Apply the grease onto the positions indicated in the Fig.C and D.
(11) In the same procedures in "3-17", install the coaster (Right) and the drive gear (Right).
(12) In the same procedures in "3-14" and "3-13" install the loading lever and the switch lever.
(13) In the same procedures in "3-12" and "3-3", install the drum unit and the capstan motor.

*Note: After reassembling, perform the tape path adjustment.

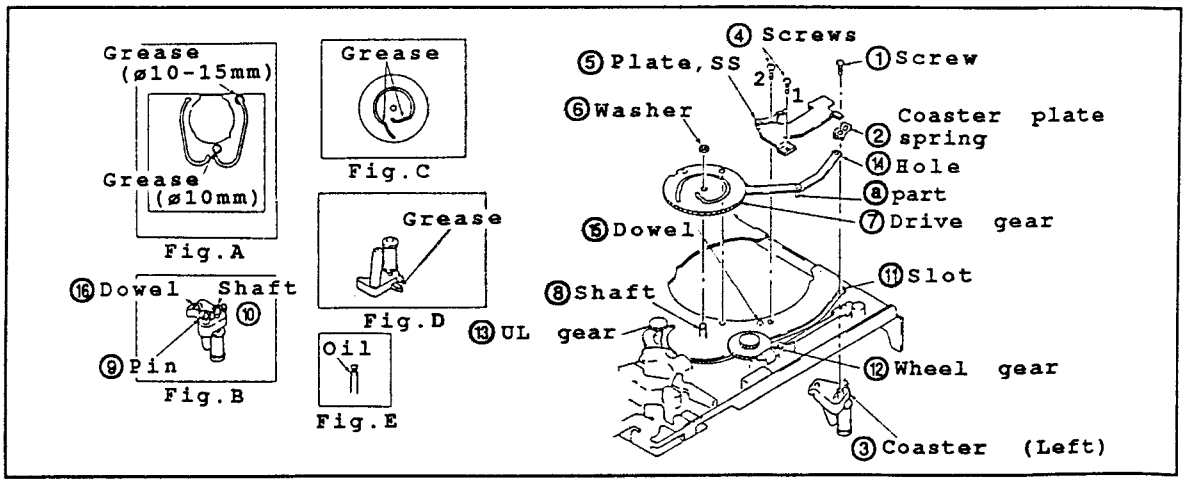


Fig.II-25

3-19 Loading Motor, Worm Assembly, Wheel Gear, Brake Releasing Arm

- Disassembling (Fig.II-26)

(1) In the same procedures in "3-3" and "3-13", dismount the capstan motor and the switch lever.
(2) In the same procedures in "3-14", detach the loading lever.
(3) In the same procedures in "3-17" and "3-18", detach the drive gears (Right) and (Left).
(4) To dismount the loading motor ②, remove the two screws ①.
(5) Take off the brake releasing arm ③.
(6) To take off the wheel gear ⑤, remove the washer ④.
(7) Unhook the six claws ⑦ of worm a'ssy..

- Reassembling (Fig.II-26)

(1) Install the worm a'ssy ⑥ while hooking the six claws ⑦.
(2) Apply the grease to the five shadow areas of worm a'ssy indicated in the Fig.A.
(3) Apply the 1/2 drop of oil to the shaft ⑧. (Fig.B)
(4) Insert the wheel gear ⑤ into the shaft ⑧, and mesh it with the worm a'ssy's gear.
(5) Assemble the brake releasing arm ③.
(6) Apply the grease onto the entire surface of loading motor gear part.
(7) Align the loading motor ② with the chassis. Then, secure them with the two screws ②.
(8) In the same procedures in "3-18" and "3-17", install the drive gears (Left) and (Right).
(9) In the same procedures in "3-14", install the loading lever.
(10) In the same procedures in "3-13" and "3-3", install the switch lever and the capstan motor.

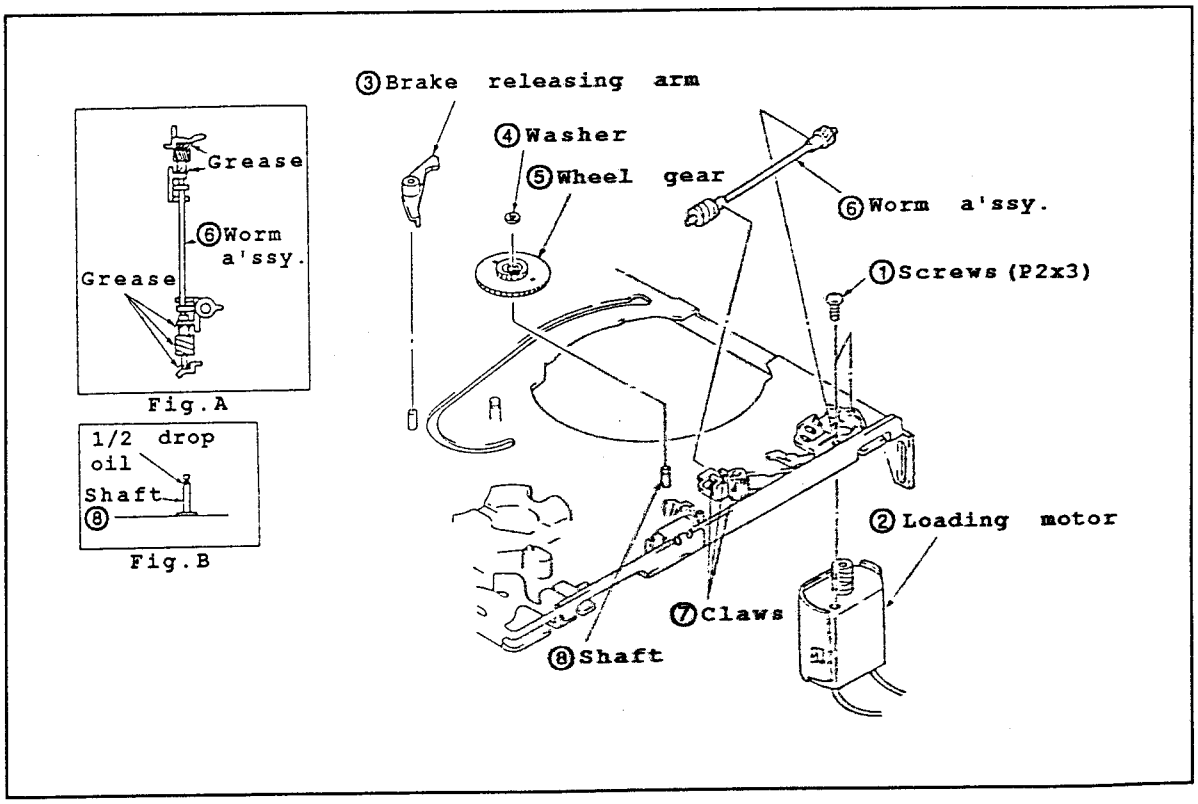


Fig.II-26

3-20 Rotary Upper Drum

• Disassembling

Note: If recordable, perform recording before disassembling.

(1) Unsolder three solderings ⓐ. Then, confirm that the terminals which come out from the hole of C.B.A. can be moved freely. (Fig.II-27)
(2) Remove the two setscrews ①.
(3) Secure the jig ④ to the drum with the two setscrews ②. (Setscrews supplied with jig ④ as a set.) Then, screw in the hexagonal bolt ③ into the hole of jig ④ to dismount the rotary upper drum ⑤. (Fig.II-28)

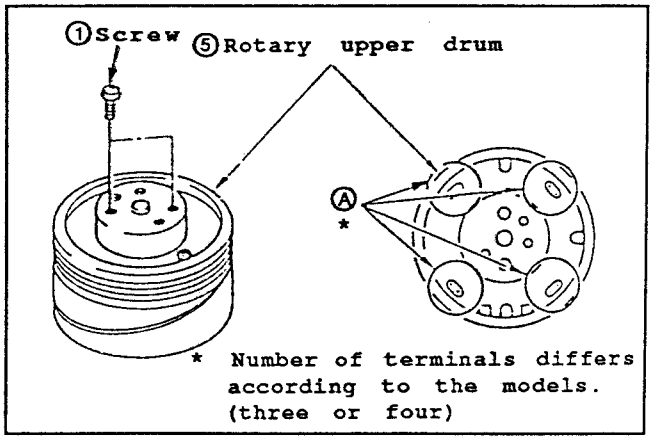


Fig.II-27

• Reassembling

(1) Clean the flange surface and the rotary upper drum ⑤ surface which faced the flange surface. Check that there is no dust particles and flaws.
(2) Insert the jig ⑦ into the drum positioning holes of upper/lower rotary drum. (Fig.II-29)

*Note: At this time confirm that the terminals ⑧ come out from the holes of the rotary upper drum C.B.A..

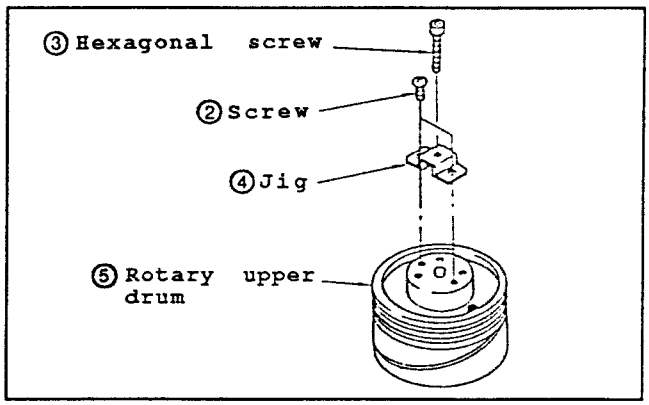


Fig.II-28

(3) Pull out the jig ⑦, and then push the rotary upper drum ⑤ into the lower one manually and gently. If it cannot be set completely to the bottom, Tighten the two setscrews ① alternately and temporarily. (Fig.II-27)
(4) Insert the jig ⑦ into the positioning holes ⑥ again.If it cannot be inserted smoothly, loosen the two setscrews ①. Then perform the step (3) of disassembling procedure.
(5) Tighten the two setscrews ① thoroughly.
(6) Solder the terminals ⓐ. (Fig.II-27)

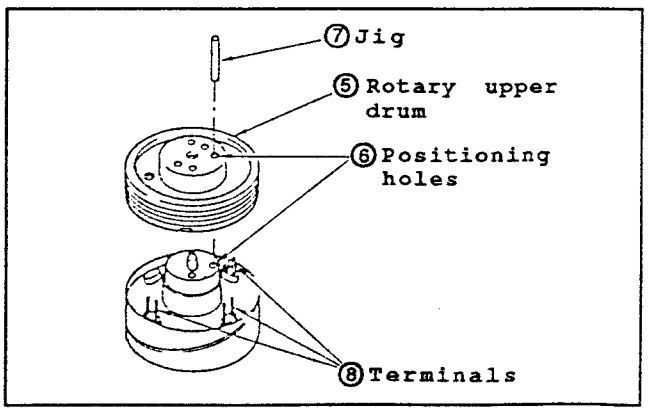


Fig.II-29

*Notes: 1. When soldering, be careful not to let the solder flow to the C.B.A..
2. After reassembling, perform the tape path adjustment.

3-21 Tension Regulator Position Adjustment (Fig.II-30)

(1) Set the cassette tape, and set it to PLAY mode.
(2) Check that the distance between ⓐ part of tension regulating arm ① and the groove ② of chassis is within 1.1 ± 0.3mm. If it is not the specified distance, perform the following adjustment (from step (3)) without the cassette tape.
(3) Loosen the screw ④ of tension regulating plate ⑤.
(4) If the distance measured in step (2) is more than specified, slide the plate ⑤ in the direction of arrow Ⓐ. If it is less than the specified slide it in the direction of arrow Ⓑ. After sliding, secure it with the screw ④.
(5) For checking, perform the steps (1) and (2).

*Notes: 1. Use the cassette tape which is forwarded to about the middle section.
2. The trail of left coaster on the groove ② of chassis: 1.1mm(approx.)

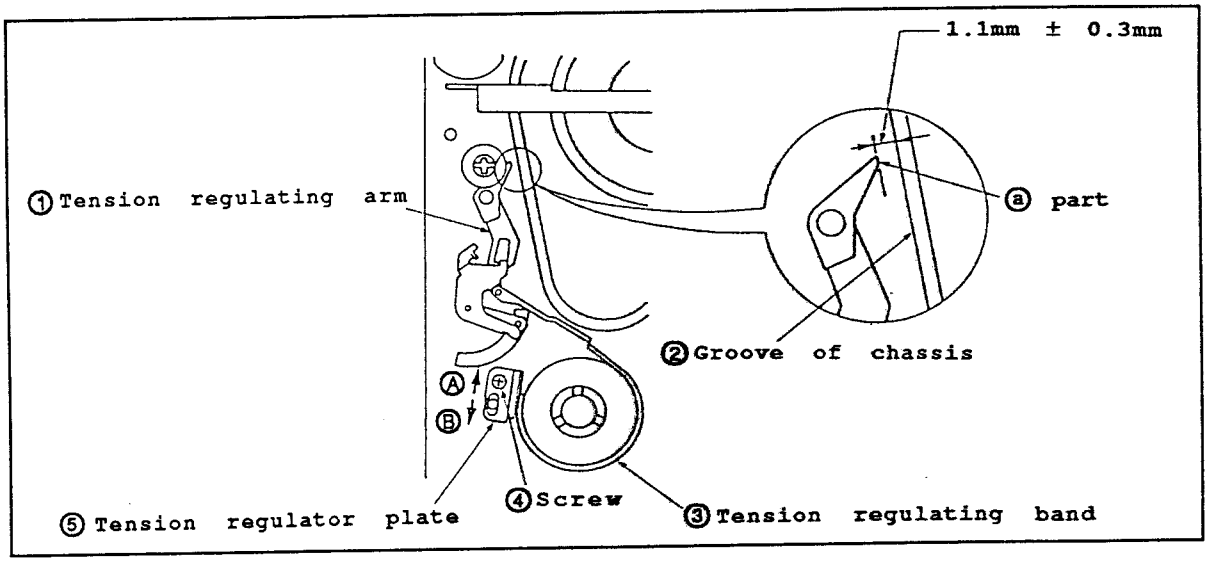


Fig.II-30

3-22 Back Tension Adjustment (Fig.II-31)

(1) Set the cassette torque gauge (DY9-1047-000)
(2) Set PLAY mode.
Confirm that the torque at S reel table is 9-13 g/cm.
(3) If not, adjust the adjust arm ①.

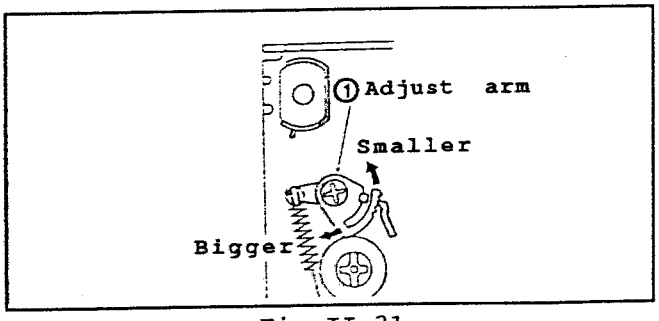


Fig.II-31

3-23 T Reel Table Torque Check

(1) Set the cassette torque gauge (DY9-1047-000)
(2) Set PLAY mode.
Confirm that the torque at T reel table is 7-15 g/cm.
(3) Set REV mode.
Confirm that the torque at T reel table is 13-25 g/cm.

4. Tape Path Adjustment

(Notes for No.7 Guide only)

As the height adjusting screw for No.7 guide is located apart from the No.7 guide . So, to adjust the No.7 guide while watching the state of tape, modify the cassette tape as shown in the Fig.II-32.

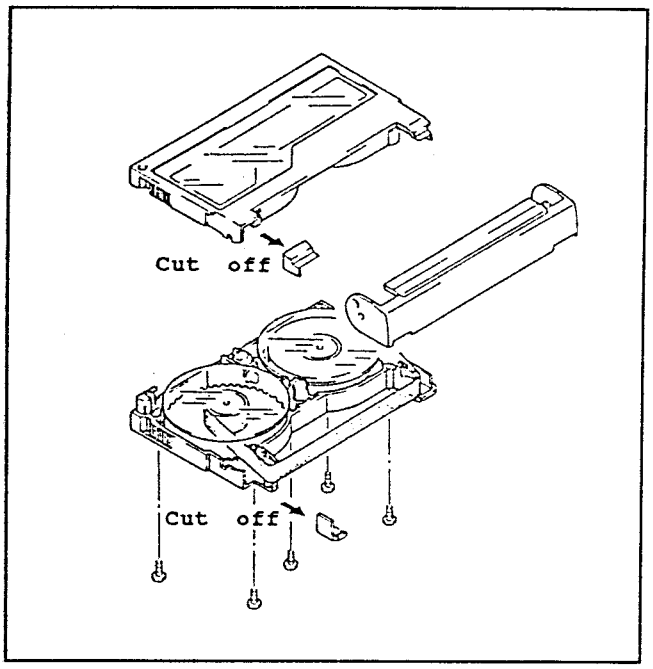


Fig.II-32

4-1 Preparation for Adjustment

*Caution: 1. Do not turn the tilt adjusting screw of the coaster (Right). Replace it if any adjustments required.The repair parts have been already adjusted.

(1) Clean the tape running surface.
(2) Referring to the service manuals for each system, observe the RF envelope signal and RF switching pulse on oscilloscope.
(3) Playback the Alignment tape for tracking.
(4) Confirm that the waveform at inlet and outlet sides are flat.
If not, perform the following adjustments from page 46.

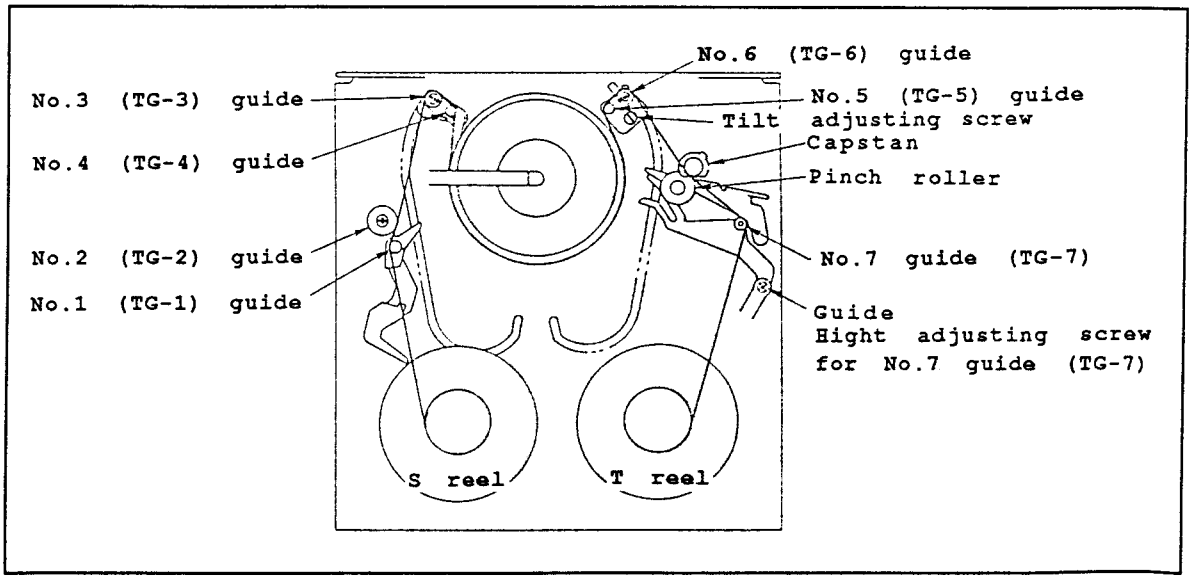


Fig.II-33

4-2 Tracking Adjustment (Fig.II-34)

(1) Playback Alignment tape for tracking adjustment.
(2) Loosen the screw ② a little by inserting a hexagonal wrench (0.89mm) or equivalent into the hole ①.
Then, turn the No.3 guide ③ to make the waveform at inlet side flat.
(3) Loosen the screw ⑤ a little by inserting a hexagonal wrench (0.89mm) or equivalent into the hole ④.
Then, turn the No.6 guide ⑥ to make the waveform at outlet side flat.

*Note: Be careful not to loosen the screws too much because the guide will be easily moved.

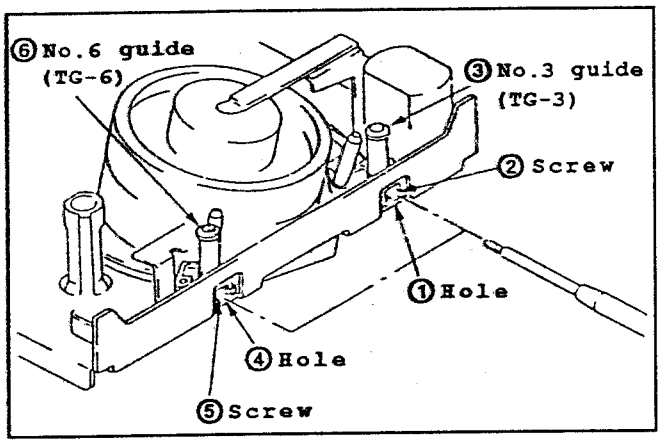


Fig.II-34

4-3 Tracking Fine Adjustment (Fig.II-35)

(1) Referring to the service manuals for each system, set it to the track shift made.(70 %)
(2) Confirm that the waveform is flat. If not, turn No.3 and 6 guides to make it flat.
(3) Tighten the screw ② of No.3 guide to lock it. At this time, confirm that the inlet side of waveform is not changed. (Fig.II-34)
(4) Tighten the screw ⑤ of No.6 guide to lock it. At this time, confirm that the outlet side of waveform is not changed.(Fig.II-34)

*Note: Torque at Screws ②, ⑤: 200g/cm approx.

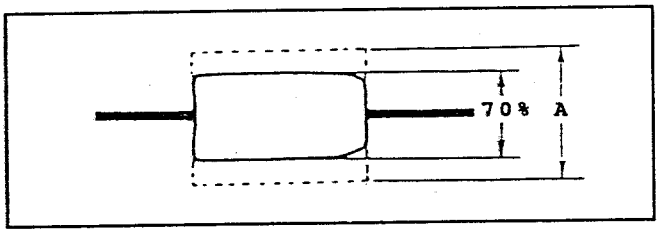


Fig.II-35

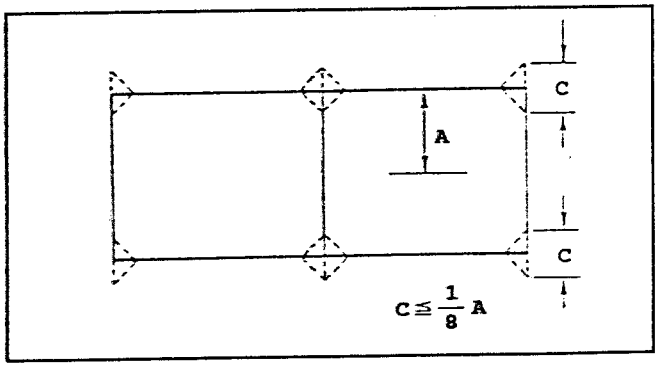


Fig.II-36

4-4 No.2 Guide Adjustment

*Note: When turning or replacing the No.2 guide, perform the following preset procedures before adjustment.

4-4-1 No.2 Guide Presetting

• To preset, adjust the distance between the surfaces of mechanical chassis and TG2 upper flange ① to 18.6 mm by turning TG2 upper flange ①.

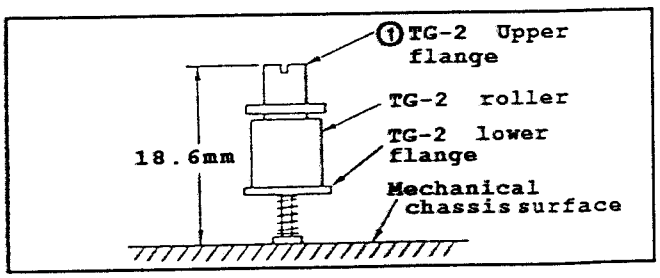


Fig.II-37

4-4-2 No.2 Guide Adjustment (Fig.II-38, 39)

(1) Playback the tape having 10μm in thickness (P6-120 etc.). Then, set it to REV mode.
(2) Confirm that the tape is not creased at the lower flange ② of No.2 guide ①. If creased, turn the upper flange ③ of No.2 guide ① clockwise until the crease removed.
(3) Playback the Alignment tape for tracking adjustment.
(4) In the same procedures in "4-2" and "4-3", perform the tracking and tracking fine adjustments.
(5) At track shift mode, playback the tape after CUE/REV mode. Confirm that the RF envelope rises horizontally within 2 sec as shown in Fig.II-40.
(6) If not, turn the upper flange ③ of No.2 guide ① counter clockwise by 90°. Then, perform the step (5) again.

Repeat the steps (5) and (6) until the normal waveform as specified is obtained.
When the RF envelope changed at this time, perform the tracking fine adjustment for inlet side. Then, perform the step (5).

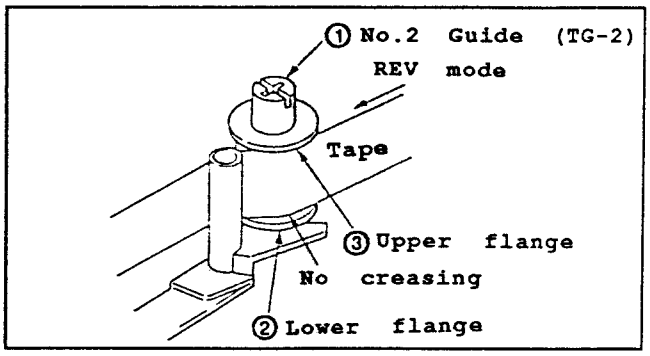


Fig.II-38

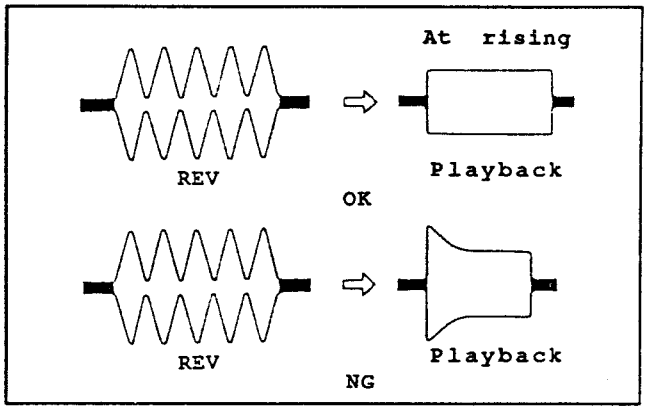


Fig.II-39

4-5 No.7 Guide Adjustment (Fig.II-40)

(1) Playback the tape having 10μm in thickness (P6-120,etc.). Then, set it to REV mode.
(2) Confirm that the tape between the No.6 guide ① and the capstan ② is not loosened. If loosened, turn the height adjusting screw ④ of No.7 guide ③ to remove it.
(3) Set it to PLAY mode. Then, confirm that the tape between the capstan ② and the No.7 guide ③ is not loosened (0.5mm or less).

If not (more than 0.5mm), turn the height adjusting screw ④ of No.7 guide ③ until the rating is obtained.
(4) Set it to REV mode again. Confirm that the tape loosening between the No.6 guide ① and the capstan ② is 0.3mm or less.

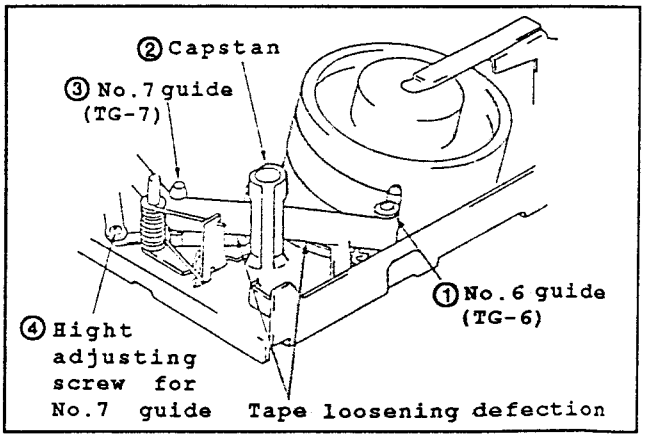


Fig.II-40

4-6 Checks after Adjustments

*Note: If the following ratings cannot be obtained, perform the tracking, tracking fine, No.2 guide and No.7 guide adjustments, respectively.

4-6-1 Tracking Check (Fig.II-41)

(1) Set it to the track shift mode. Confirm that the amplitude of RF envelope is 70% approx.
(2) Confirm that the minimum amplitude (E MIN) is 65% or more of the maximum (E MAX).
(3) Confirm that the waveform has no variations.

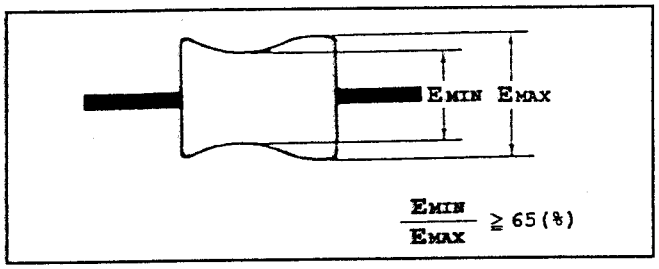


Fig.II-41

4-6-2 CUE/REV Waveform Check (Fig.II-42)

(1) Playback the alignment tape for tracking adjustment. Then, set it to REV mode.
Confirm that the tops between each waveform remains stable and equal within 5 sec.
(2) Set it to CUE mode.
Confirm that the tops between each waveform remains stable and equal for mor than 5 sec.

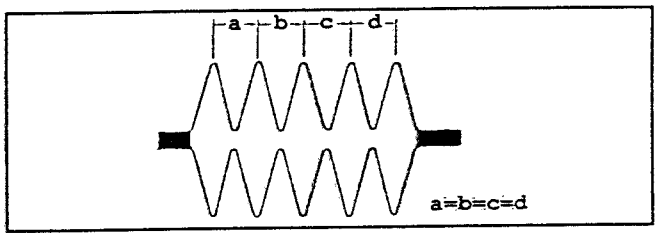


Fig.II-42

4-6-3 Rise Time Check

(1) Playback the alignment tape for tracking adjustment.
(2) After ejecting the tape once, playback it again.
(3) Confirm that the RF envelope rises horizontally within 2 sec. Also, check that the tape is not loosened around the pinch roller.
(4) After set it to CUE/REV and FF/REW, playback it again.
Confirm that the RF envelope rises within 2 sec. horizontally.
Also, check that the tape is not loosened around the pinch roller.
(5) Repeat check procedures from (2) to (4) again.

4-6-4 Tape Movement Check (Fig.II-43)

(1) Playback the cassette tape having 10μmm in thickness (P6-120 etc.).
Confirm that the tape at each guide as indicated in the Fig.II-44 is not deflected or curled. (less than 3mm acceptable).
(2) Set it from PLAY to CUE. Then, set it from PLAY to REV.
Confirm that the tape at each guide is not also deflected or curled. (less than 0.3mm acceptable).

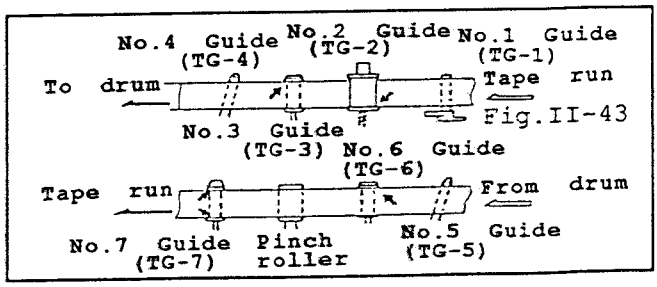


Fig.II-43